THE IRON TRADE REVIEW

VOLUME XXVII. CLEVELAND, O. DECEMBER 20, 1894. CHICAGO, ILL. NUMBER 51

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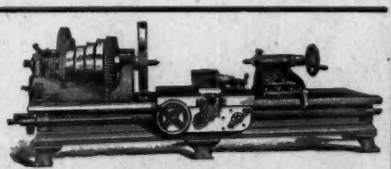

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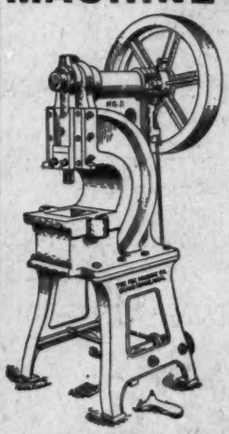

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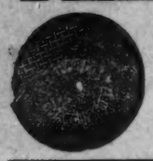

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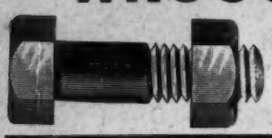

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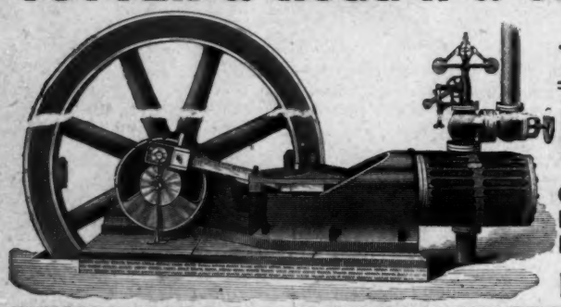

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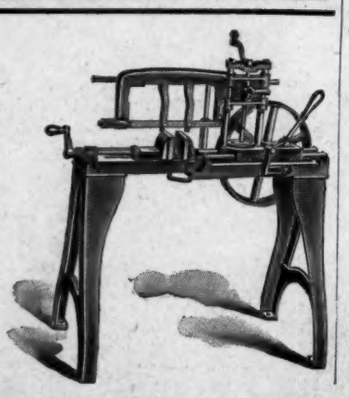

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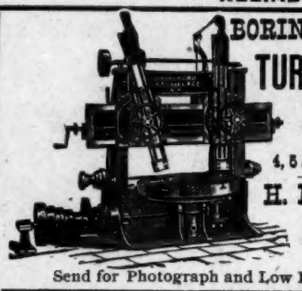

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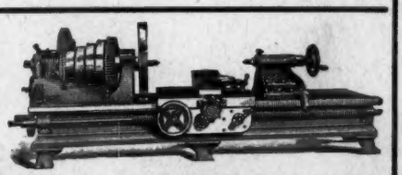

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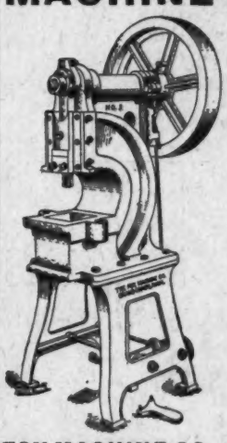

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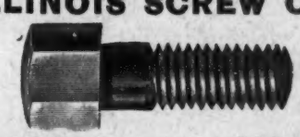

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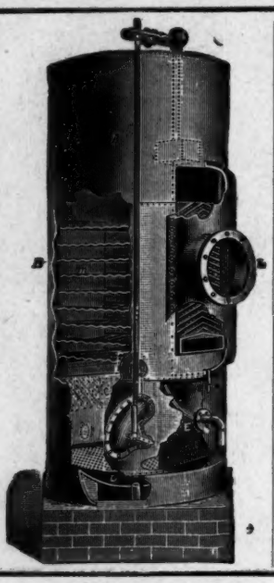

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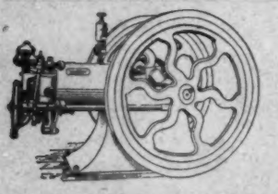

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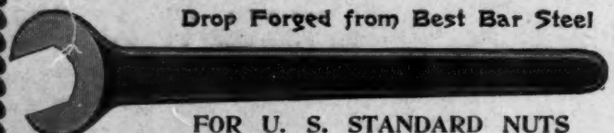

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THE IRON TRADE REVIEW

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THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

Recent developments in iron and steel have begotten a unanimous desire among producers for a new year and a new deal. Statistics of pig iron stocks show that coke iron has been piled to an extent beyond expectation and where makers have been compelled to stay on the market they have parted with their product at a figure that in some cases has meant a loss on every ton, if books are rightly kept. The largest producer of Southern iron has decided to suspend sales calling for long deliveries until there is a change for the better, but this has not prevented other producers North and South from giving buyers the full benefit of the existing weakness. It is conceded by buyers that the prices of the past fortnight are too low to last, and when the more anxious producers are filled up with orders the reaction may be looked for. In the districts supplied with Lake Superior ores the accumulation of stocks has been most noticeable, but if the latest indications as to the temper of leading ore producers are reliable, makers of Bessemer iron who have refrained from selling far into the new year are likely to find interest on accumulated iron more economical than three months and four months sales on the present basis. Bessemer at $10.15 Pittsburg last week has been followed by low valley sales, one netting the furnace $9.40 after commissions were paid. Yet there are few furnaces in the valley willing to sell into the spring at less than $9.75; and others would hold for $10 on three-months deliveries, or $10.65 Pittsburg. The fact seems to be appreciated by consumers of soft steel that the minimum has been reached. Some good sized sales are reported at Pittsburg at $15.25, with a few transactions shading that figure, in view of the extreme weakness in Bessemer. The duration of the present prices for crude iron and steel depends on the width of the gap that must be bridged to the railroad buying looked for early in '95. The few strong roads will doubtless lead off as heretofore in placing orders for rails. The ability of other roads to get money for track renewals and the rehabilitation of rolling stock put out of use for lack of funds to repair it, depends on the probabilities of increased earnings. Bearing on this question the outcome of the pooling bill is an important factor. There are some encouraging signs abroad in portions of the market that are independent of the railroad demand. Structural work will call for large shipments of steel in the first quarter of '95. Lake shipbuilding is accumulating a total much better than was looked for. The Eastern iron and steel market has developed more activity the past week. Mills in that section have closed a fair aggregate of business and the holiday shutdowns will be short. Pig iron sellers at Philadelphia have made liberal sales, considering the season and are managing to hold quite closely to quotations. In the Chicago market there has been a good inquiry in nearly all lines, with a promise that a large tonnage will be placed early in the new year.

THE CLEVELAND OUTLOOK.

Within the next two weeks some hard figuring will be done by the iron mining companies of the Lake Superior region—getting together the results of the year's business. In most caser this is known approximately to-day, and the general statement can be made that quite as many have lost money as have come out even on the 12-months' record. Labor costs have avereged lower than in any year of Lake Superior mining. From $1 for surface men to $1.50 for miners has been the range at most underground mines and it is a rare case in which a skilled miner has been able to get to $2 a day. The strongest reasons given for an advance on ore are that labor must have it and the mining companies must have it; and evidences are accumulating that it will be the policy of the strong producers to take a stand on that line. Shipments to furnaces have kept up at a good rate since the close of navigation.

Pig Iron. The week has brought no improvement in the local market for pig metal. Valley furnacemen are of varying mind regarding Bessemer. One transaction is reported that gave the furnace $9.40 after commission was paid, and $9.50 and $9.60 was done in other cases. There are no large sales on this basis, but there is considerable fignring on round lots for delivery the first three monthis of the year. Good sized piles of Bessemer appear in certain furnace yards and faith in an advance after the turn of the year is general. The chances seem less this week of a coke combination and the dollar basis is counted on for the early months of the year. Foundry iron has been in very light demand and there has been some piling of that metal also. Southern firms have turned down some low offers from consumers in this district. Lake Superior charcoal has had a moderate sale of late; recent car orders have in turn brought car wheel makers into the market for material.

Finished Material. Two plate contracts have been let by Northern Ohio firms the past week, one calling for 400 tons of plates being divided between Pittsburg firms. The other contract, which is for an uncertain tonnage of shell, flange and marine steel, also went to Pittsburg. Prices are a shade improved from the basis of a month ago. Bridge work has given Pittsburg and Cleveland mills several good contracts in the past week and there is an inquiry indicating further business early in the year. Some demand for rails is coming up in this territory both for steam and electric roads. The two ferry boats on which there has been considerable figuring of late, are of little interest to the mills, as it has been decided to build them of wood.

THE CHICAGO OUTLOOK.

[SPECIALLY REPORTED FOR THE IRON TRADE REVIEW.]

There seems to be a disposition on the part of buyers to wait until the beginning of the new year before making any purchases, although in some lines a fair business was done last week. In pig iron, the preceding week's volume of business was practically duplicated in the week under review, but it is likely that this and the following week will show a considerable falling off in sales. One large order is reported for bars and quite a good lot of small orders. Rails, structural steel and billets are quiet, with only a small business closed. In other branches of the metal market little has been done, and it is hardly probable that any large business will be closed between now and the end of the year.

PIG IRON.—The situation is about as last reported, rather small sales, but excellent inquiry for delivery the first three months of next year. In local iron the largest sale was one of 750 tons; one of 500 and one of 400 were also reported, with several smaller lots. The prospects for business the early part of next year are even better than they were last week, and it is likely that the first month will see some large contracts closed. Prices are being well lived up to, and it is expected that they can be maintained without any difficulty after the turn of the year. Southern iron is quiet, with only small sales—probably one of 300 tons was the largest. There were two or three ranging from 250 down to 100 tons, and a fair carload trade. The quotations are being cut 25c by one standard furnace, and nearly all of the smaller sellers are making low quotations. Several of the standard brands, however, are held firmly at the quoted prices, and the makers of these say they do not intend to lower their quotations to meet the cut prices, as they are well supplied with orders, and are not anxious to fill up their order books with low priced contracts for the next six months. Lake Superior charcoal is quiet, with only a very small carload trade. Prices are made as follows:

Lake Sup. Charcoal	$13 00@14 50	Southern No. 2 Soft	10 00@10 25
Local Coke Fdy. No. 1	10 25@10 50	South'n Silveries No. 1	$11 50@11 75
Local Coke Fdy. No. 2	9 75@10 00	South'n Silveries No. 2	11 25@11 50
Local Coke Fdy. No. 3	9 40@ 9 65	Jackson Co. Silveries	15 00@16 00
Local Scotch Fdy. No. 1	10 25@10 50	Ohio Silveries No. 1	14 00@14 50
Local Scotch Fdy. No. 2	9 75@10 00	Ohio Silveries No. 2	13 00@13 50
Local Scotch Fdy. No. 3	9 50@ 9 75	Ohio Strong Softeners	13 00@13 50
South'n Coke No. 1	11 00@11 25	Alabama Car Wheel	17 50@18 00
South'n Coke No. 2	10 25@10 50	Malleable Bessemer	10 50@11 25
South'n Coke No. 3	9 75@10 25	Coke Bessemer	11 25@11 50
Southern No. 1 Soft	10 25@10 50		

BARS.—Except for one order of 1,000 tons, which came from an agricultural implement manufacturer, business in the past week has been limited to car load orders. The 1,000-ton lot was taken by an Indiana mill at a price a little under the quotations, but as a rule quotations are being held stiffly. Quotations are now made at 1.05c. to 1.07½c, for common iron; guaranteed, 1.15c. to 1.20c.; steel bars from strictly billet stock, 1.25c.

RAILS AND TRACK SUPPLIES.—There is almost no demand for delivery this year, and very few and small sales were made. The inquiry for next year is picking up and it is expected that a good business will be done in the first month. Prices are made on rails at $25 for this year, and $23 for delivery next year. Track supplies are quoted as follows: Splice bars, 1.30c to 1.35c; track bolts, 2c. to 2.10c; spikes, 1.65c. to 1.75c.

STRUCTURAL MATERIAL.—Business in the past week was quiet, only a few small orders being taken for building shapes. Bridge material was not in much better demand. Prices are made as follows: Beams and channels, 1.45c to 1.50c; angles, 1.40c to 1.45c; plates, 1.40c to 1.45c; tees, 1.65c. Small lots from stock are quoted at from ¼c to ½c higher.

BILLETS AND RODS.—No large sales of either billets or rods were made last week, but the inquiry for delivery the early part of next year, and for the first six months is very large. The manufacturers do not seem inclined to take orders at current prices for long delivery, as they believe that they can get considerably better prices for their product before very long. Quotations are at present unchanged at $17 for billets, and $23.50 for rods.

PLATES.—The demand has fallen off considerably in the past week, and sales made were only small and hotly contested by the dealers. The inquiry for next year continues good, however, and it is expected that a good business will be closed next month. Prices are as follows: Tank steel, 1.35c to 1.40c; flange steel, 1.50c to 1.75c; firebox steel, 1.75c to 5c; boiler tubes, 75 per cent. discount.

MERCHANT STEEL.—Trade has been rather quiet, though one or two fairly good orders have been closed. Prices are made: Open-hearth spring, tire and machinery steel 1.75c to 1.80c; smooth finished tire and machinery 1.50c. to 1.60c.; Bessemer bars 1.35c. to 1.45c.; tool steel, 5.50c to 7.50c.; specials, 11c. and upwards.

SHEETS.—No large business was closed last week, although there are several inquiries in the market for good sized lots that will probably develop soon. Prices are made at 2.35c to 2.40c for No. 27 common; 2.40c to 2.45c. for steel sheets, and 80 per cent. discount for galvanized sheets.

OLD RAILS AND WHEELS.—The supply of old material is still largely in excess of the demand, and very small sales were made last week. Prices are made nominally as follows: Old iron rails, $10.50 to $11; old steel rails, $6.50 to $7 for short, and $8.75 to $9 for long lengths; old car wheels, $8.50 to $9.

SCRAP.—Quite a good inquiry is noted for scrap of nearly all kinds, and several good sales were made in the past week. Prices are now made as follows: No. 1 forge, $8.50 to $9; No. 1 mill, $7; No. 1 machinery, $7.25; axles, $12.50 to $13; cast borings, $3.50; wrought turnings, $5.25; axle turnings, $6.25; mixed steel, $6; heavy cast, $7.50 to $8; stove plates, $5.75 to $6; heavy melting steel, $6.75 to $7.

IN OTHER MARKETS.

[SPECIALLY REPORTED FOR THE IRON TRADE REVIEW.]

Pittsburg. Reports of low prices on Bessemer pig and on steel billets continue. Considerable business has been done in both, the past week, the deliveries being in most cases for the first quarter of the new year. Pittsburg producers have sold in moderate lots at $10.15 for December and January delivery and $10.25 has been secured on deliveries extending to April 1. One transaction is reported on a basis netting the valley furnace $9.40. On gray forge 9.40@9.60 is the range. A good deal of the business done the past two weeks has been through brokers. It is evident from late buying that consumers believe soft steel is at the lowest point. There is one rumored sale at $15.05 at maker's mill, and on the other hand a large transaction is reported on a basis of $15.50 delivered at buyer's mill. The market may be fairly quoted at $15.25 with a firmer feeling. Indeed, the recent sales of Bessemer have strengthened the feeling on the part of such producers of that metal as have been holding aloof from the market and piling their iron. The tonnage of billet sales the past week was larger than for some time. The coke question has been without developments. There is still an effort to secure an advance in

the price, the operators realizing that something must be done to better prices and wages if a strike is to be averted. The production in the week ending Dec. 8 was 143,353 tons, against 142,774 in the week preceding. Active ovens numbered 14,212, against 14,280 in the preceding week. The possibility of higher prices for raw materials two months hence does not affect values in finished material. They are still on a basis that leaves no profit, and the demand, for close delivery, is very light. The changes and repairs at the largest mills will curtail their production greatly in the next 10 days. The majority of mills have been running fairly full from week to week, but there has been of late some price cutting to get orders to run through the dull time of early January. Quotations are made on beams and channels, 1.25c@1.30c.; on tank plates, 1.15c@1.20c.; on universal plates, 1.10c@1.20c.; on common iron bars, .90c @ .95c.; on No. 27 common iron sheets, 2.15c@2.20c.; on No. 27 steel, 2.25c@2.30c. The mills are reducing stocks of all kinds and hence very little is done on old material.

St. Louis. Buyers are withholding their orders from the market until the turn of the year. The trade in iron is principally carloads. The Southern furnaces seem prepared to meet all demands for any grade of iron at prices previously quoted.

Buffalo. Buyers as well as sellers generally concede that higher prices will be seen in the spring, though most people do not look for a decided advance. January and February will very possibly be dull months but the first half of December has registered a considerable number of good sized orders, with more in the wind.

Cincinnati. There have been a few inquiries for round lots of iron, deliveries scattered throughout the first half of next year, but as a general thing buyers say they will not place any contracts until after the first of January. Prices remain without quotable change, but there is a weaker tendency. A number of furnaces are making special prices for immediate shipment. The inquiries for cars have resulted in more interest in the iron market on the part of a number of car wheel makers. There has not been much done, but if the contracts now talked of are placed for cars, it will result in a decided increase in the demand for charcoal car wheel iron. There is more pressure to sell Northern brands of iron made from Lake Superior ores, and stocks are accumulating to some extent. Most of the settlements are now in cash and buyers who were in the habit of giving notes when doing a large business are now able to get along without credit.

Philadelphia Owing to fear of a freeze in Eastern rivers, Southern iron is coming forward as fast as cars are secured for transportation. The ore situation is unique. The situation of furnaces is more unique. There will be a great curtailment in mining of Jersey ores. Lake Superior ores must command at least living prices. If our Northern furnaces, therefore, expect to keep in operation much longer they must pay more for ore and will undoubtedly have to pay more for coke. It is surprising that furnaces, under these conditions, will book orders for future delivery in the face of probabilities of a loss on the later deliveries of such contracts.

WIRE drawers at the American Wire Mill, Cleveland, have asked for a restoration of the old rate of wages but the management declined, owing to low-priced contracts. A strike is not likely.

STOCKS in the American Pig Iron Storage Warrant Co.'s yards Nov. 30, 1894, were 101,000 tons and on Dec. 10, 101,300 tons.

COMPRESSED AIR IN SHOP AND FOUNDRY.

An important contribution to the discussion on uses of compressed air, at the Montreal meeting of the American Society of Mechanical Engineers, was made by Chas. D. Heggem, M. E., superintendent of the engine works of Russell & Co., at Massillon, O. We quote from it:

"Compressed air has been used in these works as a means of power transmission for six or seven years, beginning with a 600-pound hoist and increasing from day to day until at present there are in operation 26 five ton cranes, one cupola stock elevator and a large number of small hoists, varying from 400 pounds to 1,000 pounds capacity. Shears and punches in the boiler shop, where out of the way of the line shafting, are being operated by compressed air. One form of shear is applied to the cutting off of stay bolts in locomotive boilers. Here by the aid of compressed air two boys may cut off 700 or 800 stay bolts per day of 10 hours, which is far in excess of what could be accomplished by hammer and chisel as formerly used."

"It is in the foundry that compressed air is more especially of service, as its elastic action makes it very convenient in drawing patterns, closing flasks, etc."

"The air is supplied by three compressors. A 10-inch x 13 inch belt driven compressor runs constantly and supplies most of the air that is used. The working pressure is from 60 to 70 pounds. A 7½-inch by 7-inch steam driven duplex compressor is operated by a pressure valve so that when the pressure of the air falls below 60 pounds this compressor is put in motion to supply the deficiency. The air supply is thus maintained automatically. A smaller steam driven compressor is kept merely as a reserve in case of accident to either of the other machines. The air is stored in three reservoirs of 250 cubic feet capacity each, and these reservoirs are placed in those parts of the works where the greatest volume of air is required. Owing to the intermittent use of the air, these compressors are able to furnish a sufficient amount, and at a cost of something like $3 per day of ten hours."

"The piping aggregates about 2,500 feet, and is 2½ inches in the main line with 1½-inch and 1¼-inch branches. Two of the reservoirs are about 1,000 feet apart, but the pressure in each, as shown by the gauge, is the same."

Low Prices on Bridge Work.

The American engineering and trade journals have recently been calling attention to the very low prices at which bridgework may now be purchased at American mills, and have been advising those who have large orders to place to consider how far they should place contracts in the United States while structural materials remain so low. It appears that recently American-made steel plates and angles have sold at 1.15c. per lb. delivered at Philadelphia and New York, while the price is 1.09c. at Newcastle, 1.14c. at Hull, and 1.22c. at Liverpool. It is now some 10 or 11 years since the Union Bridge Co. came into the market and took the contract for the Hawkesbury River bridge in New South Wales, but since then American firms have not been very successful outside of their own country, and this is attributed to the alleged fact that American designs have been copied in Europe.—[London Coal and Iron Trades Review.

ROGERS, BROWN & CO., of Cincinnati, have recognized the necessity of having an agent in Cleveland and tributary territory constantly and have located in Cleveland Mr. N. H. Ashley formerly of Buffalo. His office is No. 511 Perry-Payne Bldg. Mr. Ashley comes with a well established reputation as a successful and intelligent pig iron salesman. He represents a complete line of pig irons adapted to all mixtures.

AT Sharon, Pa., the Aschman Steel Castings Works were sold Dec. 18, to E. A. Wheeler and J. J. Spearman, officers of the company, who advanced money to pay the company's debts when it was embarrassed several months ago.

THE Shoenberger Steel Co., has given notice of its intention to apply for a charter of incorporation.

THE IRON TRADE REVIEW

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AMERICAN ARMOR PLATE LEADS.

The most important announcement that has come to the iron and steel trade of the United States in a long time is the news, which is officially confirmed to *The Iron Trade Review*, that the Bethlehem Iron Co. has been awarded a large armor plate contract by the Russian government. All the side armor for the two new Russian battle-ships, amounting to about 1,200 tons, is involved, and the fact that the contract was keenly competed for by European and American armor-plate manufacturers makes the success of the Bethlehem Company the more gratifying. The superiority of the Harveyized plate over any produced in England or on the Continent is established by ample testimony, and it need not be said that the Russian government fully satisfied itself on that point before making the award of the past week. Though next to the youngest of America's iron and steel industries, native armor plate manufacture, in the few years since the two Pennsylvania plants were established, has developed processes which the oldest European establishments are hastening to copy. Naval Secretary Herbert, in his recent report calls attention to the long lead American armor plate has secured in the international race, through the use of nickel steel and the Harvey face-hardening method, and experts pronounce the American battle-ships the best armored in the world. It is not entirely creditable to the fairness or the patriotism of some of our officials that such emphatic recognition of American armor plate achievement should come so closely upon a campaign of criticism and persecution at home.

Russia has declared in the most positive way her belief that ships protected by American armor are better armored than those of any other nation. The officers of the Bethlehem Iron Co. have cause to be proud that the merit of their product is too pronounced to be obscured by developments at home that might be expected to create strong prejudice abroad.

THE CAR-WHEEL FOUNDER'S PROBLEM.

Not a little has been said about cheap car wheels in the past 18 months. More will be heard on the subject, doubtless, when the day comes for removing some of the wheels that have been put under cars since the advent of the ¾c.-a-pound product. That there is a wide variance in the length of service of different makes of wheels, is the testimony of records kept by the motive power departments of the railroads; and since wheel founders who use the more expensive mixtures have declined to receive from the railroads old wheels of certain other makes, there has been a more careful study of the subject by the railroads from the standpoint of ultimate economy. The stringent policy of expense reduction pursued by the purchasing agents of all lines, together with the fact that wheels are taken under explicit guarantees of service, has given the lowest-priced wheel a wider market than it would secure under ordinary conditions.

The superintendent of an ore-carrying railroad in the upper peninsula of Michigan called the attention of a pig iron producer, not long ago, to a wheel which had just been sent to the scrap pile, and remarked that it had been in constant use 25 years. He asked as to the character of the iron in it and the natural inquiry came next, why equally long-lived wheels had not been available to railroads in recent years. The reply was that the wheel in question was made of all charcoal iron and that no doubt the wheel could be duplicated to-day if the buyer were willing to pay the price. On the other hand, car wheel makers whose mixture is coke iron and scrap are making as high mileage guarantees as their competitors whose mixtures are more expensive, and it is even intimated that some of them who are now guaranteeing 80,000 miles are prepared to increase the figure to 100,000 miles, and to furnish wheels that will stand the most rigid tests of the railroad companies. The chemist, it need hardly be said, is an important factor in such results and it is the testimony of those who have made most use of him, that the high-priced mixtures of the old school car wheel maker represent an increment of cost several times the salary of a well-paid chemist. The car-wheel records of the railroads for the next few years will furnish the data that will determine which policy is to prevail in the long run.

CHARCOAL IRON IN 1894.

The blast furnace figures of Dec. 1 give a basis of estimating quite closely the output of charcoal iron in 1894. In the first half of the present year, as shown by the statistics of the American Iron and Steel Association, 102,697 gross tons of charcoal iron were produced in the United States, with an average of 19 stacks in blast. In the six months about ending the average of active stacks at the first of the month has been 23, and the average weekly capacity 4,549. A close approximation to the output for the second six months would be 113,000 tons, making the total for the year in the neighborhood of 215,000 tons. This is the smallest total in many years and may be taken as an indication not only that less charcoal iron was made, owing to the general depression, but that the make of charcoal iron is declining relatively to the total from all fuels. Taking the official figures for the three preceding years and estimating the second half of 1894 to make the total for the year, we have the following showiug:

PRODUCTION OF CHARCOAL PIG IRON AND ALL PIG IRONS IN THE UNITED STATES—GROSS TONS.

	1891.	1892.	1893.	1894 (est.)
Charcoal iron	576,964	537,621	386,789	215,000
Total pig iron	8,279,870	9,157,000	7,124,502	6,600,000
Per cent. charcoal	6.9	5.8	5.4	3.25

The decline in percentage of the total pig iron product is seen to be from 6.9 in 1891 to 3¼ in 1894. The causes for this tendency have been much discussed and familiar. Chief of all is the increasing use of coke iron in malleable and car wheel mixtures, and the problem charcoal furnace firms have to face is such a reduction of costs as will bring their product nearer to a coke iron basis. On this proposition and on the general outlook for the charcoal iron industry in Michigan and Wisconsin,

which furnish about half the entire product of that metal, we quote from a letter to *The Iron Trade Review* from an interest in close touch with that trade:

The outlook for Lake Superior charcoal pig iron is discouraging, first, on account of the general depression and dark outlook in the iron business in every section of the country; but probably a more important fact is the supplanting of charcoal iron by coke iron, by the malleable manufacturers to a large extent; and also the disposition of the car-wheel foundrymen to use the better grades of coke irons. The charcoal metal is certainly as good for malleable purposes as the coke metal and would find a market equally as quickly as the coke at even figures; but the best furnace practice cannot bridge the difference in cost of metal in the furnace yards. There has been little or no improvement (as a general proposition) in our Lake Superior furnaces or their practice, while there has been in the coke plants and practice. Not a furnace in the charcoal iron trade has made a dollar in two years; many have lost much. Those running are doing so to exhaust ore, or to use up wood contracted for, rather than run the risk of its loss through forest fires, etc. The fact must be faced that the charcoal furnace business is on the decline. The coke furnace capacity is sufficient to furnish nearly all metal needed and even were the business to be most active, we will say on a 30 per cent. higher plane of figures, it would not permit the general resumption of the charcoal plants. The wood supply is becoming scarcer and naturally higher each year and one cent a bushel added on charcoal at the furnace would mean 85c@95c per ton. I do not believe that the owners of charcoal metal are inclined to wait for better figures, as competition shows the strongest sort of desire to realize.

A more hopeful view of the situation is taken by the producing firm from whose letter to us we quote below:

When during the past season L. S. charcoal pig iron was sold at $12.50 per gross ton, f. o. b. cars Buffalo, this company quietly withdrew from the market. We had a fine stock in store and furnace in blast. We have now in store almost six months' production, and furnace making about 90 tons a day. So since last September we have been "making and piling"—this action based upon our faith in a better market and price to come, not quite yet in sight but certain to come at no very distant day. We have had frequent calls for metal but as we refused to accept the prices quoted, the orders were not booked. We do not intend to imply that we have not sold any iron, for we have a few customers that pay our price. We are determined to hold our iron until we can get c. i. f. and a little more, and we propose to include interest in the cost, insurance and freight. Of late we feel encouraged from the general reports noted and particularly by offers from melters to purchase at current quotations for extended deliveries, say for lots of from 200 to 500 tons per month, payments to be based upon delivery, which were declined. Nor will we book orders now at our price except for immediate delivery and settlement. A number of wheel makers say they cannot pay our price and sell wheels. The only consolation we had to offer was that they must do without our metal or take our advice and advance the price of their product. Some have sold wheels at prices that made us do solid thinking before we would furnish them metal on space.

THE National convention of manufacturers to be held at Cincinnati, Jan. 22, is already an assured success, as far as numbers and interest measure success. The committee of the Manufacturers' Association of Cincinnati and Hamilton county announce that a large and representative attendance is promised and they are sanguine of large results. Foreign trade extension, particularly in the Latin-American countries, is the chief question to be considered, and out of all the preliminary discussion of the past few months and the deliberations at Cincinnati we shall look for a permanent organization that will secure for the manufacturers of the United States returns from this trade that have been impossible, with the single-handed effort of recent years, or at best the combinations of three or four firms, sharing the expense of a single agency. A strong organization of manufacturers, putting aside all political considerations and uniting for trade extension, ought to count for much in shaping policies made at Washington. There has been an excess of politics and a lack of business sense in much that has been done officially relative to foreign trade.

FURNACE firms interested directly or indirectly in Mesabi range mines are using quite high percentages of new range ores. At Rosena Furnace, New Castle, 58 per cent. Mesabi is employed and large outputs have been made—1,900 gross tons in one recent week, while the average for a number of months has been 1,800 tons a week. The Lucy Furnaces of the Carnegie Steel Co. also use 58 per cent. of the same ore that is used at Rosena. At Edith Furnace, Pittsburg, five-sixths of the mixture is Mesabi Mountain. At Girard Furnace, 75 per cent. of Biwabik is used and it is expected that this percentage will be increased. At the "Red Jacket" Furnace at New Castle, the Mesabi percentage is 16⅔ and in the majority of merchant furnaces the percentage is in the neighborhood of 25.

SEVEN Western bar iron salesmen, on hand at a recent letting, agreed in discussing the course of trade in that line, that they and their principals were conspicuous incapables and that the degeneracy in prices and in practice which had marked the business done in '94 was heaped up folly. Perhaps this criticism is more severe than would be tolerated, did it come from any source outside the trade, but it must be admittted that ordinary English would not do justice to the situation. Jan. 1, 1895, is a good time for turning over a new leaf. It may not be possible to "reform altogether" the trade abuses that have gradually crept in, but the day has certainly come for a heroic effort to get prices on a living basis.

THE estimated weekly pig iron output of furnaces in the Pttsburg and Wheeling districts, Northern and Eastern Ohio, Mahoning, Shenango and Conemaugh valleys, Chicago and Bay View was 111,317 tons on Dec. 1. Separating as closely as possible those running on Bessemer, the Bessemer production on that date from furnaces using Lake Superior ores was at the rate of about 4,500,000 tons yearly—or at the rate of 7,500,000 tons of Lake Superior Bessemer ores a year.

THE Treasury Department statement of October imports of iron and steel to the United States shows considerable increase over October, 1893, particularly in tin plates. The total of the latter was 24,005 tons against 11,521 tons in October 1893, and for the month the iron and steel total was 33,560 gross tons against 18,515 gross tons. Up to Oct. 31, imports of iron and steel were 248,348 tons and to the same date last year, 394,295 tons. The iron ore total for October was 18,895; for October, 1893, 13,227 tons. In the ten months ending Oct. 31, there were imported 131,815 tons; in the same period last year, 501,345 tons.

PIG iron imports to the United States in the first 10 months of this year were 12,770 tons, as against 51,838 tons in the same 10 months of last year; of bar iron, 9,423 tons against 13,425 to Oct. 31, 1893; of scrap, 1,666 tons against 6,005 tons to Oct. 31, last year.

CAST STEEL AND CAST IRON FOR BRAKE SHOES

The Sargent brake shoe, referred to in a recent issue, is made of cast steel, where it is designed for service on driving wheels, that metal being found to afford the maximum holding power and dressing effect on the tire under the ordinary conditions of service. For coach wheels, the Sargent shoe is made from a mixture of charcoal iron. The tires on coach wheels are not worn by the rail as rapidly as those on driving wheels, and therefore the necessity of wearing down the tire by the brake shoe is not so great. The steel shoe has been found to wear the tire too rapidly, and the best results have been obtained from a cast iron brake shoe of high grade metal, which gives a fine-grain, medium hard wearing surface.

Until recently, attempts to design a brake shoe that should wear on the tire of a steel tired wheel at such points as are not worn by the rail, and so to keep the tire well dressed at all times, have been confined to an effort to distribute in the cross section of the shoe the metal of the shoe, in such a manner as to compensate for the rail wear on the tire. The Sargent Co., of Chicago, decided some time ago that the metal of the shoe cou'd not be properly distributed in the cross-section to give the desired results, and for several months has been working on the idea that the proper distribution could be obtained in the plan or the wearing face of the shoe. The company has recently placed on the market a shoe, developed in actual service, and designed in accordance with the new idea. Fig. 1 shows the relative positions of rail, wheel and brake shoe. Fig. 2 shows the design of the shoe and how the metal is distributed in the plan so as to give the amount of wear at the various points necessary for the proper dressing of the tire. That part of the brake shoe which bears on the part of the tire projecting outside of the rail is solid; so, also, is that part of the shoe which bears on the flange of the tire; connecting the two solid parts, are three ribs, and the metal that would fill the spaces between the ribs represents the action of the rail on the tire. In other words, the rail wears from the tire an amount of metal that would be worn off by the metal that is lacking from the brake shoe to make the shoe solid. It will be seen that over that part of the tire that is worn by the rail there are three narrow bridges in the shoe, and these are supposed to be just about enough to keep this part of the tire circular by grinding off any high spots.

FIG. 2.—THE SARGENT TIRE DRESSING BRAKE SHOE.

CUPOLA ECONOMIES.

Economical melting is an end all foundrymen are grasping for, but what each individual regards as economy is a different matter, and circumstances often render it impossible to accomplish the same results in all places. One will say: "Let me melt with the least possible amount of fuel; that is economy. Time consumed or blast pressure used makes no difference in expense, neither do they increase or decrease my output, but actual saving in pounds of fuel represents so many dollars." Such is the case when the shop is far removed from the localities where coke is made, and shipping makes it expensive, or where the cupola capacity is larger than necessary for the work it has to do, and rapid melting is not a necessity.

Another will say: "Rapid melting is what I desire; a few hundred pounds of fuel is no object. The quickest time I can make in running off my heats is dollars to me. Delay means decreased production, time cut off my molders, or an extra assessment in the direction of overtime paid to men for staying late." The foregoing is true of shops where cupola capacity is small and heats large, and numberless times have I observed men sitting around or doing little, but simply waiting for iron. Not a cent was ever made in saving fuel at the cost of a decreased production, no matter if coke was expensive.

Again, one will observe: "My blower is small and I have not engine or boiler power to drive it as rapidly as necessary. Show me how I can melt cheap and use low blast pressure; fuel or time count for little if I melt successfully with the fixtures I now have. Cannot afford a new boiler, engine and blower."

Still, again, the cry will come: "If I can run my cupola with a reasonable amount of fuel and make fair time, 'twould be satisfactory, but it wears out the lining so rapidly, 'tis a constant source of delay and expense to re line so often."

Complaints of cupolas bridging over and bunging up in the middle of the heat, not being able to slag satisfactorily, making dull iron, and a hundred other complaints, show the barriers to economy that each individual encounters. All these things come up every day, and in each particular instance the individual idea of economy is true, so far as that individual is concerned.

The stove molder does not seek for a record of 12 to 1 as much as a practice that will produce good, uniform, fluid iron; with him the exact condition of the iron is of vast importance and nine to one with good iron is far preferable to 12 to one and have the iron doubtful, while heavy work can be made from iron that does not require attention in the same direction. Some firms use all pig iron and express wonder at not being able to show records similar to others, who, no doubt, are using from 50 to 75 per cent. scrap, probably a great portion of it stove plate or light machinery. Some use an inferior grade of coke and expect the best results.

Economy, as I understand it, is the cheapest way of executing work, at the same time maintaining its quality. If three or four dollars worth of fuel extra will decrease the time of melting, so the molders can produce twenty dollars worth more work, that is true economy. Or if fuel is cut too close or the cupola run carelessly, and the iron comes dull and loses twenty dollars through work that did not run, that is not economy, even though a cupola record of high merit is shown. Every cupola must be run to suit the conditions and facilities, and no individual record is worth the paper written on to foundrymen unless the conditions are known and judgment used to obtain similar results. No cupola can obtain the highest possible efficiency in all directions—have the best record for ratio of fuel, time, blast pressure and condition of iron. It is impracticable for many reasons, but judicious management will often bring the results near.

Neither can a 10-ton heat be melted as economically in a 40 inch cupola as in a 30, but time is worth more than the four or five hundred pounds of fuel saved on the bed in many cases, and again the highest ratio of fuel is impracticable.

Some men in showing their records quote what they use between charges, leaving the bed out or charge for lighting fire, as they term it, and show results that are sometimes misleading. If only one charge was melted, and that on the bed, I presume their record would be 1,500 to nothing, or whatever they used in the first charge of iron. In some ways, though, this method of figuring is good. It gives a basis to

record a heat of any length without the bed making any difference, and shows what the cupola will do independent of it, but a short heat cannot be judged safely in this manner, for a heavy bed will support three or four charges melted with insufficient fuel between them. The actual bed should never be lost sight of, for it is the most important factor in charging and in the successful management of the cupola. Another item often omitted in records of melting is how much iron was dropped with the bottom. Often a ton of iron will be dropped through, and the record show that ton to be melted, which is not fair practice.

Some cupolas require a heavier bed than others; for example a cupola built with low tuyeres, where the iron is taken as fast as melted, does not require the same amount of fuel for a bed that one built to hold twenty or thirty hundred of iron below the tuyeres would. Yet the cupola with the high tuyeres is probably the most economical, for it mixes the iron better and permits the use of more scrap or pig iron of poorer quality than the one that runs continually.

A cupola may also be placed in a part of the country where the altitude is high, say, seven or eight thousand feet above sea level, and the conditions of blast pressure vary greatly, as will also the melting, and wonder may be expressed as to why it does not equal what is done in other localities.

They will say: "We use the same formula of charging, cupola, fuel and everything, but can't obtain results." Neglect to study the individual condition is the cause of their failure. The same thing is often true of patent cupolas; they will be erected and run according to the formula laid down by the patentee, but fall short of the claims made for them, and the actual work they have done in some other locality, and why? Some little difference in erection, blast pressure or fuel used, some little carelessness from the cupola tender, or some misunderstanding of the formula of working, coupled possibly with ignorance of the principles of the art. * * *

Progress is rapidly being made in this business, and cupola practice is becoming an art that has its devotees as surely as any other. To keep up with this march of improvement requires the constant study of those connected with the business, and they must do it if they expect to equal the results of others who give it their time and attention. It is not so much a question of patent or new cupolas, as the management of and improvements applied to those we now have. Many of our patent ones are excellent, but lose their greatest efficiency through lack of knowledge and common sense in management. The way a cupola is handled or run is the entire foundation on which its truest economy is based. —[Herbert M. Ramp in American Machinist.

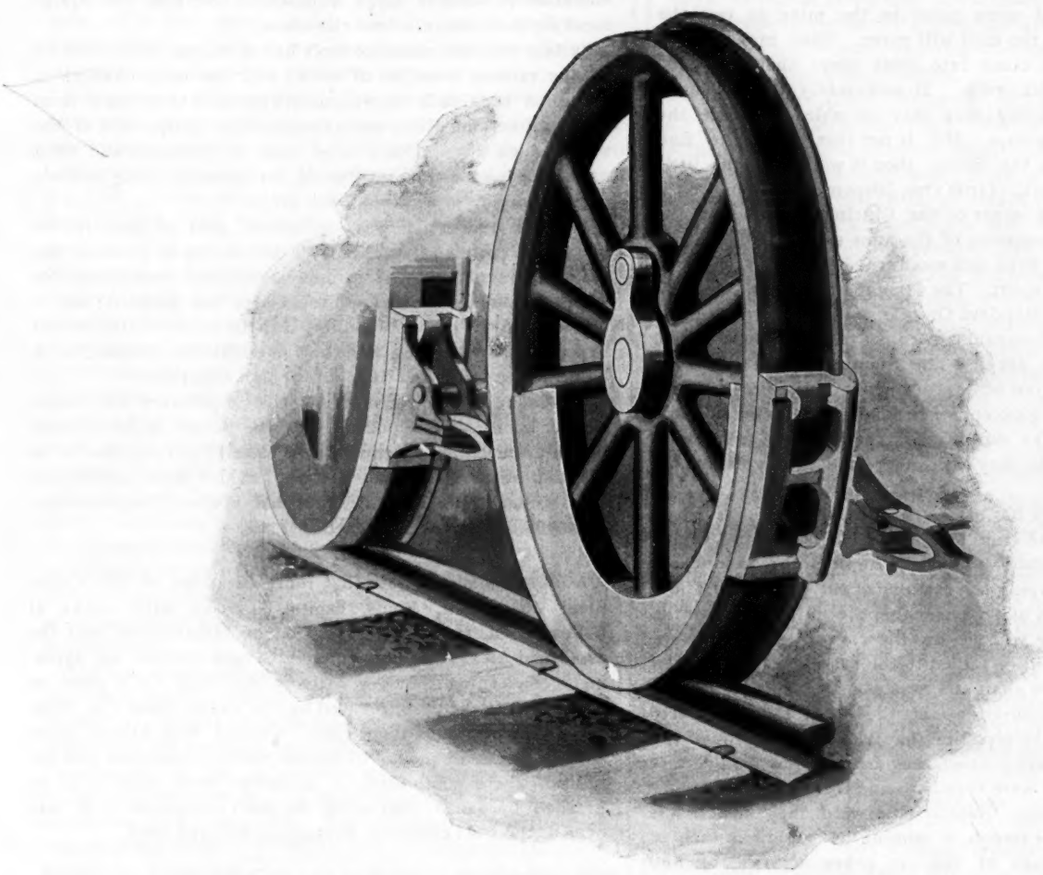


FIG. 1.—THE SARGENT TIRE DRESSING BRAKE SHOE. See Page 8.

Machine Work of the Bethlehem Iron Co.

An officer from the Navy Department, in speaking of the work which has been done for the Navy Department by the Bethlehem Iron Co., referred to the shafts of the "Raleigh" and "Cincinnati," and said that when they were delivered to the navy yard it was found necessary to put them in the lathe in order to do some special fitting on them which had not been called for in the specifications given to the Bethlehem Company. In order to do this, plugs were turned up and driven into the hollow shafting, and these latter were found to be perfectly straight, 6 inches in diameter through a 13-inch shaft, and the testing of them with calipers from end to end could detect no variation in the diameters; and when they were finally swung in the lathes on these plugs they ran as true as though they had been on their original centers. The template which was made for the thrust bearing for one of these shafts was found to fit so accurately on the thrust bearings of the other three, two being used for each ship, that on only two of the collars of the whole four could the faintest glimmer of light be seen when the template was in position. Everything was polished and given a smooth water finish, as fine as that put upon the finest and smallest of work. When the eccentrics were to be bored out, it was found that one template was insufficient for boring out all of the eccentrics for all of the engines, the shafts being so accurately turned that any eccentric could be used in any position. When we take into consideration the size of the work done and the accuracy, it certainly speaks well not only for American mechanism, but also for the care and accuracy of the work done by the Bethlehem company.—[American Engineer.

PIG iron production in Germany was 490,934 tons in October, 1894, against 437,183 tons in October, 1893. For the 10 months ending Oct. 31, 1894, the total was 4,579,180 tons; for the same 10 months in 1893 it was 4,084,056 tons.

LAKE SUPERIOR IRON MINES.

Upon the snowy surface of the depression made by the removal of the water from what was once Lake Angeline, there is a long string of red ribbon that is attached to stakes driven in the ground. It marks the lines of the underground workings as shown in the first level of the mine. The foot and hanging walls are readily traced, and there is much information to be gained by the uninformed concerning the area of ore at this property. Were a similar deposit stripped of its overlying drift it might compare favorably with some of the big mines of the Mesabi range. There is no more stripping to be done than is handling at the big Biwabik, of the Mesabi. There is a difference in the character of the overlying burden, however. The Mesabi's is rock and earth, while much of the Cleveland Lake's is a too moist silt that runs upon the slightest provocation. The Cleveland Co. is not considering any scheme for stripping its ore deposit, however. It is an underground mine. At some time they may decide to bring the surface down to follow the ore that is mined out, but this is not the plan now in vogue. They have thought of making a trial at some point in the mine to test the freedom with which the mud will move. They may open a way for the silt to come into some stope that has been previously filled with rock. If sufficiently thin to filter through the rock filling they may be able to handle the accumulation with pumps. If it is not thin enough to find an entrance through the filling, then it would present little danger to mining work.—[Iron Ore, Ishpeming, Mich.

The suit of the fee owner of the Cincinnati mine, on the Mesabi, to regain possession of the mine came up in district court in Duluth last week and was turned over to a referee to hear testimony and report. The Cincinnati Ore Co., the first lessee, sublet to the Standard Ore Co. and both are sued. It is alleged that both companies are insolvent and the cancellation of the leases is asked. The Standard Ore Co. answers that it has spent $65,000 in improvements on the property and has continued mining except when financial depression made it impossible; that the outlook for the iron ore business is good and that the company has completed arrangements for the sale of ore.

While mining work has been suspended at the Lake Shaft mine of the Cleveland Iron Mining Co., at Ishpeming, Mich., it is probable that about half the mine thus thrown out will be employed in stripping the east end of the property. There is upwards of 20 feet of drift over the ore in this part of the property and mining will be on the cave-in plan. The ore from the open cut will be milled to the first level, then taken by electric cars to the shaft and hoisted.

While laborers employed at the Cleveland Lake property were trenching for the pipe line that is to be laid around the east end of the old lake bottom, they struck a few boulders of fine blue ore. They were very hard and the ore gave evidence of being of fine quality. Shortly afterward they struck soft hematite ore in their trench, it coming to within an inch of the surface. Analyses of the ore prove it to be of fine quality, containing .012 per cent. in phosphorus. The probable quantity cannot be estimated at this time, as enough work has not been done to give any idea of the extent of the deposit. There is a foot of mixed soap and paint rock, the ore dips to the west at an angle of about 60 degrees, and the conditions are most favorable. The diorites are not far away, still they stand up sharply, and it is thought by some that they may form the hanging, at least to a considerable depth. Should this prove to be the case the new find may prove to be a very valuable one to the Cleveland Iron Mining Co.—[Iron Ore.

Judgment was ordered in the Ashland, Wis., Circuit Court, last week, for $32,382.12, in favor of the Northern Chief Iron Co., against the Germania Iron Mining Co., on promissory notes.

The annual meeting of the Anvil Mining Co. was held last week in Milwaukee. The reports stated that nothing in consequence had been done during the year. The mine is now largely owned by the Nunnemachers. The officers re-elected were: President, E. A. Conrad; vice-president, J. B. Lesaulnier; secretary, A. P. Conrad.

The mining companies of the Gogebic range voluntarily advanced the pay of landers on Dec. 1. The rate was made $1.20 per day instead of $1.00 as heretofore.—[Ironwood, Mich., News Record.

Figures given out by the D. S. S. & A. Ry. show the total ore shipments from Marquette in 1894 to be 1,424,256 tons, against 1,086,934 tons last year.

The Desire of a Tool Builder.

A tool builder whose business—or at least a large share of it—is in the line of fitting up factories with special machinery and tools for the economical production of small machines and appliances in large numbers, was saying the other day that a considerable portion of his time was taken up in trying to form conclusions as to what was to be the next new development in manufacturing of that class.

Years ago, guns and other small arms had claimed his attention; then it was sewing machines; then typewriters; then cash registers, and now bicycles. One after the other the various articles had been first constructed experimentally in his establishment, and then as they became regular articles of manufacture, he had in some cases taken contracts to manufacture them in large numbers or had sold the equipment for their manufacture elsewhere.

Certain standard machine tools had of course, been used in all the various branches of work, and the only changes in them had been such improvements as could be devised from time to time, but there was a considerable proportion of the work which was special, a large class of machines and tools used in typewriter manufacturing, for instance, being entirely useless on bicycle work and *vice versa*.

As a tool builder, he was, of course, glad of this, for his business depended largely upon his ability to produce machines and tools adapted to new conditions—conditions for which the older machines and tools were not adapted; and if he only had the power of looking into the future a little further to see what was coming, and thus be enabled to prepare for it, he would be somewhat happier—or less miserable.

We frequently see references to the importance and necessity for business men looking into the future as far as possible, but a machinery manufacturer has all the incentive to do this that other business men have, besides some others that are peculiar to his business, and that ordinary business men do not have.—[American Machinist.

A PRESS dispatch says that representatives of the Valley Steel Co., of St. Louis, capital $450,000, with works at Belleville, Ill., the Union Trust Co., of Indianapolis, and the combined Alexandria land companies have reached an agreement concerning the New Albany Rail Mill Co.'s plant at Alexandria, recently purchased by the Valley Steel Co., from the Union Trust Co., for $75,000. The old New Albany plant and the Belleville plant will be removed to Alexandria and the rail mill there completed. A Bessemer steel plant is to be finished by Jan. 1, 1896, when the land companies will turn over to the steel company $175,000 in lots and cash.

THE executive committee of the Tennessee Coal, Iron & Railroad Co. has decided to suspend sales of round lots of iron for future deliveries, at present prices. The demand for the company's product is reported to have increased of late. The statement of the company for November makes a favorable showing.

CHAS. M. SCHWAB, general superintendent of the Homestead Steel Works, who has been in ill health for some time, will start early in January on a three months' trip through Europe and into Egypt.

WIRE rod purchases East and West have been somewhat increased, but at prices under $22 Pittsburg. Nail mills are making a push for business with buying light and cut prices continue. Several more tin plate mills have started non-union. In spite of the small output prices are weak. Foreign importations have been heavier and Welsh manufacturers are getting wage reductions of from 10 to 20 per cent. Some of the Welsh tin plate workmen, however, are still standing out, while some of the manufacturers insist on a full 25 per cent. cut.

AMERICAN ARMOR PLATE THE BEST.

The award of a large contract for Russian armor plate to the Bethlehem Iron Co. is one of several tangible evidences that have been accumulating since the armor plate flurry of some months ago, that the plate manufactured in the United States is superior to any in the world. Another development of some significance, in the same connection, is the recommendation of Secretary of the Navy Herbert to the Senate Naval Committee, that the Carnegie plates now on certain war vessels be not removed as contemplated by the Cummings resolution. The Secretary granted that in all probability they would come up to the proving tests, yet contended that they did not come up to the contract requirement that the company should make the best plate in its power to make. It is probable, therefore, that the "scandal" of the first session of the present Congress will thus be allowed to die out. One reason, evidently, for the position of the Naval Secretary is Senator Quay's proposition to return the fine of $140,484 to the Carnegie Steel Co., in case the plates removed came up to the requirements of ballistic tests. The last issue of the *Bulletin*, which reviews the developments of the past few months in regard to American armor plate, makes these pertinent comments:

Our readers will remember the sensational attacks which were made about a year ago, in the columns of some leading newspapers, upon the quality of the armor plates which had been supplied to the Navy Department by the Carnegie Steel Co., Ltd. It was said that some of these plates, which had been accepted and bolted to the sides of the new cruisers, were defective and known to be such when they were "palmed off" upon the Government officials. They were "honeycombed" with blow-holes, which had been "puttied up" by direction of the bosses who had charge of their manufacture. A member of Congress, Hon. Amos J. Cummings, proposed to investigate the "scandal" through a committee of the House of Representatives, and the investigation was made, and it developed no fact to establish the truth of the charge that the armor plates in question were defective in any essential particular. The only shadow of excuse for the newspaper stories and the Cummings investigation was furnished by two or three "informers," whose previous relations as employes of the Carnegie Steel Co. should have discredited any statements of "fraud" they would make. It turned out that the plates which these "informers" said were imperfect were in fact of such superior quality that they were above the Government requirements.

And now comes the sequel and the ample vindication. In the recent annual report of Hon. Hilary A. Herbert, Secretary of the Navy, occurs the following splendid tribute to the excellence of the armor plates which had been supplied to the Department by the Bethlehem and Carnegie companies: "The progress made in this country in the manufacture of armor has been remarkable. To make such armor repuires a plant costing millions of dollars and workmen of skill and experience. Two great armor-manufacturing plants have been established in this country. The very first plates produced are believed to have been equal to any then turned out in the oldest establishments of Europe. The Department, however, was not satisfied with this. It demanded improvement upon European armor, and improvements were made, first, by the introduction of an admixture of nickel with the steel, and, secondly, by face-hardening by means of the Harvey process. Thus, it is believed, *our armor became very early in the process of its manufacture far and away the best in the world. European navies are now adopting similar methods.*"

President Cleveland refers with gratification in his annual message to the great progress that has been made in the construction of a new navy, and indirectly commends the excellent work of our armor-plate plants. He says: "Attention is called to the report of the Secretary of the Navy, which shows very gratifying progress in the construction of ships for our new navy. * * * If we are to have a navy for warlike operations, offensive and defensive, we certainly ought to increase both the number of battleships and torpedo boats. The manufacture of armor requires expensive plant and the aggregation of many skilled workmen. All the armor necessary to complete the vessels now building will be delivered before the first of June next. If no new contracts are given out contractors must disband their workmen and their plants must lie idle. * * * *I recommend that provision be made for the construction of additional battleships and torpedo boats.*" If our armor-plate plants were unequal to the severe requirements to which Secretary Herbert has above referred we may be sure that Mr. Cleveland would not have recommended that additional contracts be given to them.

Expert testimony is also just at hand to show that the armor plate which has been furnished to our Government by American enterprise and skill is worthy of the highest praise. In a paper in the *Engineering Magazine*, of New York, for December, on "The Armor Plate Question," by Capt. W. H. Jaques, until recently the ordnance engineer of the Bethlehem Iron Co., that gentleman says: "The unfortunate complications between labor, manufacturer, and officials in connection with the supply of armor by the Carnegie Co. have not materially interfered with the supply for our ships. Without criticising the methods of the manufacturer, or questioning the judgment of the officials, both of them, as well as the American people generally, have the gratification of knowing that, *as far as investigation and supplementary tests go, the United States ships are protected with better armor than the specifications called for, and that these requirements are more severe than those of any other nation.*

In a paper in *Cassier's Magazine*, of New York, for December, on "The New American Navy," Mr. Lewis Nixon, naval constructor at Cramp's shipyard, says: "Although public opinion in America has been wrought up, of late, over the armor question, there seems to be no doubt that *the armor which has been delivered is among the best in the world, and that ships protected by it are perhaps even better armored than those of any other nation. The irresponsible charges* against the stability of American vessels have been investigated, and ships of all classes are now regarded as fully seaworthy, so that this agitation, which at one time threatened to injure the hold of the vessels upon the popular mind, which depended, as everything American must depend, upon their being the best of their kind, *has died a natural death.*"

Capt. Jaques and Mr. Nixon are gentlemen of the highest professional standing, and their statements above quoted, if other testimoney were lacking, may be accepted as conclusive evidence that the new American navy has been armored with the best plates that could be made.

Our armor-plate manufacturers deserve the gratitude of the American people for their courage in the investment of a large amount of capital in a business that was entirely new in this country and which was attended with very great risks. The Bethlehem Iron Co. did not deserve the public reprimand of Secretary Tracy, under the administration of General Harrison, for its failure to deliver armor plates as promptly as the Navy Department wanted them, and the Carnegie Steel Co., did not deserve the heartless criticisms which it received in some leading newspapers a year ago.

Death of a Well Known Western Foundryman.

William Stormont, who has been one of the prominent foundrymen of Illinois, for a number of years, having operated a foundry in Ottawa since 1856, died on December 11th, aged 77 years. Mr. Stormont was born in the north of Ireland, and learned his trade in Belfast, working there and in Glasgow for a number of years, finally coming to this country to Chambersburg, Pa., where he was foreman for his father-in-law, William Gilman, until he started for himself in Ottawa. A number of the prominent foundrymen of the country have at one time or another worked for Mr. Stormont; among them Mr. W. A. Jones of Chicago, who was with him for several years after 1866. Mr. Stormont was a member of the Methodist Church for 40 years, and was a 32d degree Mason. He leaves a daughter, Mrs. Will K. Knowles, whose husband has been connected in business with Mr. Stormont for the past two years, and who will probably conduct the business in the future.

THE Kansas City Car & Foundry Co., of Kansas City, Mo., have completed their plant, and start with a number of orders on their books reported to be sufficient for a three months' run.

A broken shaft has kept the New Castle Steel Works idle for the past two weeks, but a new shaft is now in position.

NEW ELECTRIC TRAVELING CRANE.

An improved traveling crane intended to supply the demand for a substantial, inexpensive appliance for lifting loads of from five to ten tons, has been invented by General Manager Geo. W. King, of the Marion Steam Shovel Co., of Marion, O. These cranes are in use in the Marion works and one with a lifting capacity of six tons was installed in the complete new plant of the Whiteley Malleable Castings Co., at Muncie, Ind. The length of the span between tracks, of the crane here illustrated, is 47 feet. The crane proper travels on its track at the rate of 160 feet per minute, the trolley travels across the crane at the rate of 75 feet per minute, and the load is hoisted 25 feet per minute. All movements are controlled by friction gearing, and the speed can be made as much slower than

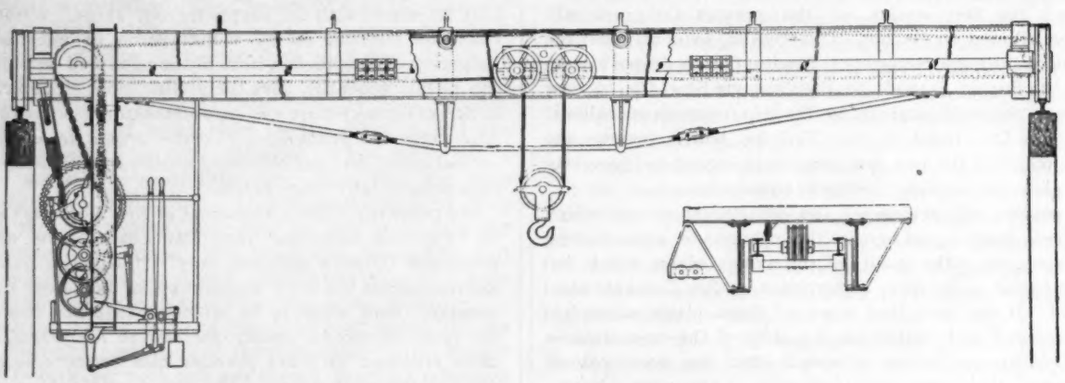


FIG. 1.

above noted as the nature of the work may require. One electric motor running continuously in one direction furnishes the whole power. The movement of the crane proper in either direction, the movement of the trolley in one direction or the other across the crane, and the raising or lowering of the load, are entirely independent of each other. The operator is thus enabled to raise or lower the load and cause it to travel in any desired direction at the same time. The motor and machinery are located at one end of the crane close by the side of the operator. All parts are thus easily accessible and the strain of their weight is taken off the bridge.

In the accompanying cuts, Fig. 1 is a side elevation of the crane, the track upon which the crane proper is mounted be-

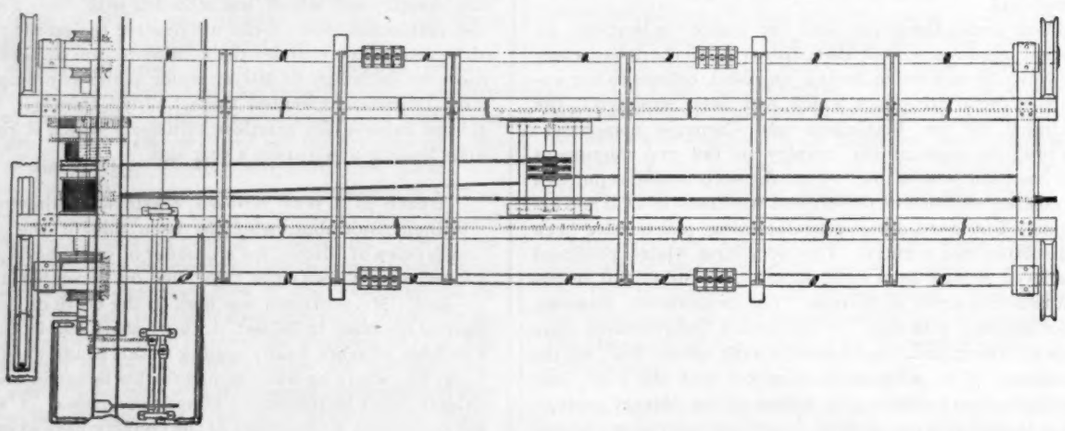


FIG. 2.

ing shown in section and portions being broken away to show more clearly the construction. Fig. 2 is a top plan of the machine. Fig. 3 is an elevation partly in section, of the end of the crane at which the driving machinery is located.

The devices perfected by Mr. King reduce materially the weight of the machine and carry the operating machinery at or near one end of the crane, thus relieving the bridge. Motion for moving the crane proper along the track on which it is mounted, for moving the trolley along its track and for hoisting and lowering the load carried by the trolley is communicated from the shaft A. The apparatus employed for moving the crane proper laterally consists of an endless chain engaging a pocket or chain pulley operatively mounted on one of the axles of the carrying-wheels of the crane, the sections of the chain, leading from opposite sides of the pulley, (see Fig. 3), passing downwardly to and over pocket pulleys r r' respectively, and thence leading upwardly to and over an idler and tightener where they meet. The pulleys r r' are loosely mounted on the shaft A and it will, therefore, be observed that the crane proper is actuated in the one direction or the other according as pulley r or pulley r' is operatively connected with the shaft A. Suitable clutches are employed for establishing operative connection between the pulleys r r'.

The arrangement of parts is such that the hoisting drum is operatively connected with the shaft A or released according as the lever is actuated in the one direction or the other. Suitable brake mechanism is also provided for holding the load when elevated and propelled and to govern the descent of the load. The brake comprises a brake-band passed around and adapted to frictionally engage an annular rim on the one end of the hoisting-drum. The brake-band is applied in the usual manner of brake bands, and is operatively connected with a bell-crank-arm or lever that is suitably supported from frame-work and arranged parallel with and a suitable distance below and at one side of the hoisting-drum.

The Marion Steam Shovel Co. are manufacturing these cranes of span and lifting capacity adapted to the work required.

The Sharp Reduction of Railroad Dividends.

The *Financial Chronicle* of New York shows the injury done not only to the railroads, but to general trade by freight rate cutting and by the falling off in the volume of traffic. It gives a list of 24 leading railroad companies which have reduced their dividends during the past year with the amount of capital affected and the extent of loss to investors. By this list it is seen that during the past year the dividends on $727,000,000 of railroad stocks have been reduced or passed, and the annual rate on the new basis represents a loss of $15,655,000 per annum to the investors in those stocks. One-half of the list has suspended dividends on a par value of about $300,000,000.

THE new coke pile at the Carnegie Steel Co.'s furnaces at Bessemer, Pa., will be 240,000 tons—twice the size of the pile accumulated there before the last coke strike.

SELF-TROUBLED TIN PLATE MEN.

M. Lough, 553 The Rookery, Chicago, writes the London *Iron and Steel Trades Journal*, giving some reasons from a United States view-point for the present unsatisfactory condition of the Welsh tin plate trade. He thinks the Welsh manufacturers themselves are largely to blame. We reprint the greater portion of his communication:

The English manufacturers who came out here in 1891, have almost to a man now returned wiser and poorer, but, in the meantime, the Yankees have profited by the experience which they thus gained, and the skilled workmen who were then brought out have now turned their knowledge to the advantage of this country, and there is no doubt whatever but that the manufacture of tin plates which has been established in other countries —Germany, Spain and Italy—have originated in the same way. This does not seem to have been a very patriotic scheme on the part of your countrymen, nor does it seem to have resulted to their pecuniary advantage.

In addition to the above, there are many other causes which tend to the decline of the importation of tin plates into this country, and which at the present time are giving the American manufacturers a firm grip on the trade which it will be impossible hereafter to loosen. The chief of these causes being:

First, the irregularity of the shipments from Wales. It is a source of universal complaint all over the United States that no tin plates are shipped on time according to contracts. We know, as a matter of fact, that many orders for tin plates which were placed in May and June last are still unfulfilled, and as for the orders sent forward during July, August, and September, the percentrge of the plates thus ordered that has come forward is indeed very small.

This is a state of business that the American purchasers of tin plates will not long continue to submit to. In sending their orders to Wales they have to buy in comparatively large quantities, and place their orders considerable ahead of their requirements, thus taking the risk of the market, and for the past two years this has been a great source of loss to them; whereas, if they placed their orders with the local manufacturers, they can buy in much smaller quantities, and can depend upon a much earlier delivery, and although they may have in some cases to pay a higher price, yet they are quite willing to do so, as the advantage thus gained is of more value to them.

And further: The local terms of payment are very much more advantageous than the import terms, the latter being, as a rule, "Cash against documents," while the former are from 60 to 90 days, or less one or two per cent. discount for cash in ten days.

Another great cause for complaint is the irregularity in the quality of the plates shipped. The low price of plates now prevailing has tempted many manufacturers to skin down the quality of the plates to such an extent that they cannot now be depended upon, and of late there have been very frequent complaints that the plates packed in the same boxes vary very considerably as to weight and thickness, and also the boxes in which the plates are packed being so light and so badly nailed together, they are utterly incapable of standing the handling incidental to such long transmission, and on arrival at destination it is found that a large percentage of the boxes are broken and the plates damaged.

The foregoing matters are all within the control of the English manufacturers, and if they do not remedy them speedily, they will find when it is too late that the tin plate trade of Wales has passed into other hands.

The question of freight rates, to which you allude in your issue of the 9th inst., to points in the United States, is not a matter of very much consequence, as there is very little fear that the local jealousies of the various railway companies will allow of any very considerable advance in the through rates now prevailing. In fact, some of the companies are offering to guarantee the existing rates for six months.

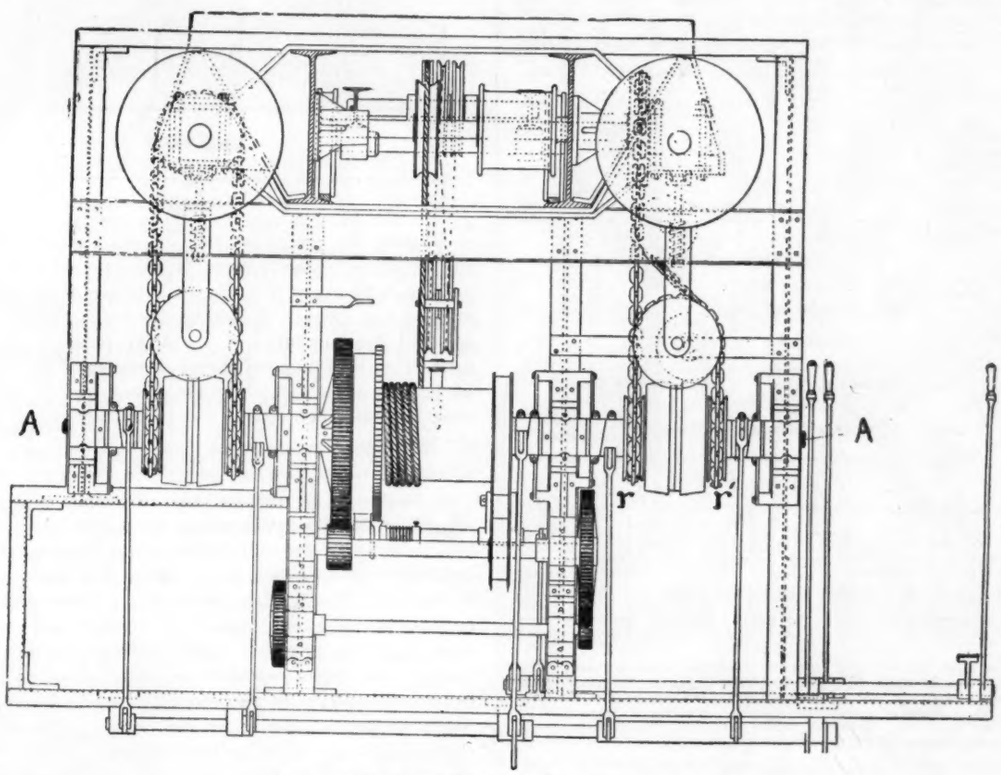


FIG. 3.—SMALL TRAVELING CRANE. See Page 12.

THE total number of the mines registered in Spain is over 15,000, of which only about 2,000 are worked. The province of Biscay, however, still gains very considerable profits from its rich iron ore mines, as may be deduced from the fact that in 1893 out of a total production in Spain of 5,497,540 tons, the consular district of Bilbao was responsible for 4,918,650 tons; whilst in 1892, out of a total for Spain of 5,405,170 tons, the consular district of Bilbao furnished 4,573,560 tons. The exportation of iron ore from Bilbao to the United Kingdom in 1893 was over 3,000,000 tons, and as the total foreign import of iron ores into the United Kingdom was 4,065,863 tons—3,624,083 tons from Spain and 441,780 tons from other countries—it appears that shipments of Bilboa ores made up 84% of the importation from Spain and 75% of the total foreign importation of iron ores in the United Kingdom in 1893; and, calculating the yearly production of iron ores in the United kingdom to be 14,000,000 tons, it would appear that Bilbao supplies about the fifth part of the iron ores yearly consumed in the United Kingdom.

CONDITION OF BLAST FURNACES OF U. S.*

December 1, 1894.

Location of Furnaces.	Charcoal.					Bituminous or Coke.				
	Total No. of Stacks.	In Blast.		Out of Blast.		Total No. of Stacks.	In Blast.		Out of Blast.	
		Number.	Weekly capacity	Number.	Weekly capacity.		Number.	Weekly capacity.	Number.	Weekly capacity.
New England	11	2	214	9	810	..	..	..	..	..
New York	6	1	105	5	615	5	2	2714	3	3335
Pennsylvania	13	1	55	12	985	5	2	1960	3	2000
Pittsburgh	..	..	..	..	..	24	22	40619	2	3120
Spiegel	..	..	..	..	..	2	2	1640	0	0
Shenango Valley	..	..	..	..	..	15	15	16580	0	0
Jun. and Con. Vals	..	..	..	..	..	17	7	7263	10	4750
Maryland	6	0	0	6	490	5	0	0	5	5955
Virginia	4	0	0	4	210	23	9	5955	14	7458
North Carolina	..	..	..	..	..	2	0	0	2	745
West Virginia	..	..	..	..	..	4	2	2536	2	1095
Ohio—Mahoning Val	..	..	..	..	..	12	9	11870	3	3970
East, Cent. & North	..	..	..	..	..	17	14	15462	3	1995
Hocking Valley	..	..	..	..	..	6	1	195	5	2250
Hanging Rock	10	5	306	5	465	11	8	2037	3	605
Kentucky	3	0	0	3	865	6	2	706	4	1770
Tennessee	9	2	377	7	2035	14	6	4996	8	4960
Georgia	3	1	263	2	375	2	0	0	2	1200
Alabama	13	3	694	10	2525	38	15	15380	23	14240
Indiana	..	..	..	..	..	2	0	0	2	275
Illinois	..	..	..	..	..	19	10	18307	9	10990
Michigan	20	6	1803	14	4575	..	..	..	..	..
Wisconsin	5	1	757	4	1120	4	2	1748	2	1540
Minnesota	..	..	..	..	..	1	0	0	1	665
Missouri	2	1	275	1	305	3	0	0	3	2280
Texas	4	1	172	3	845	..	..	..	..	..
Oregon	1	0	0	1	280	..	..	..	..	..
Colorado	..	..	..	..	..	3	2	1897	1	840
Total char. and coke..	110	24	5021	86	16500	240	130	152265	110	76038
Total anthracite (New York, New Jersey, and Lehigh, Schuylkill, Upper and Lower Susquehanna and Lebanon valleys.)	130	37	21039	93	37915	..	..	..	..	..

SUMMARY.

Fuel.	In Blast.					Out of Blast.			
	Number.			Weekly Capacity.			Number.	Weekly Capacity.	
		Month Previous.	Year Previous.		Month Previous.	Year Previous.	Month Previous.		Month Previous.
Charcoal	24	23	23	5,021	4,799	4,129	86	87	16,500	16,545
Anthracite	37	37	34	21,039	19,383	17,139	93	93	37,915	37,890
Coke	130	128	73	152,265	147,232	76,821	110	111	76,038	77,380
Total	191	188	130	178,325	171,414	98,089	289	291	130,453	131,815

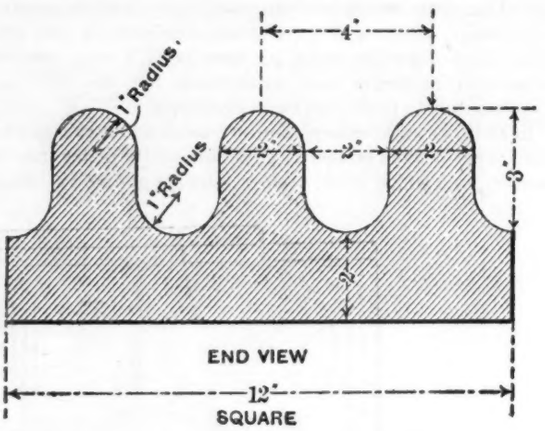
*The above table is condensed from the *American Manufacturer*. The tables of the *Iron Age* show in blast Dec. 1, 22 charcoal furnaces, with 4,491 tons weekly capacity, instead of 5,021; 38 anthracite, with 21,872 tons weekly capacity, instead of 21,039; and 124 coke, with 142,399 tons weekly capacity, instead of 152,265. Total, 184 active furnaces, with a total capacity of 168,762 tons, instead of 178,325, as above.

E. Windsor Richards on Our Enormous Production.

Mr. E. Windsor Richards, president of the Iron and Steel Institute, speaking at the annual dinner of the Leeds Association of Engineers on Dec. 1, alluded to his recent visit to the United States. He said it could not be wondered at that there should be depression in trade in the United States because the power of production there is enormous. England is a free trade country, he said, but Americans are worse off, although theirs is a protected country. Ten years ago at Messrs. Bolckow, Vaughn & Co.'s they rolled 4,000 tons of rails per week, and that was considered a great thing; but at the Carnegie Steel Works they turn out 8,000 tons of rails per week, and these rails are entirely manipulated by machinery. If America had only free trade he was perfectly sure she would rob England of a great deal of business. What he feared was that America would have such an amount of protection that she would sell to China and other countries at very cheap rates in the same way that the continental makers did, so that manufacturers in England would be greater sufferers still. But, after all, one should not take a gloomy view of trade in England. British manufacturers have experienced great depression, but they are no worse, indeed he thought they were better, than some continental countries, and they certainly are much better than manufacturers in America.

NEW TILE FOR FURNACE BOTTOMS.

A fire clay tile especially adapted to use in the bottoms of heating furnaces in tin mills and sheet mills has been designed by Ambrose Beard, Jr., the well known sheet and tin mill expert, and is being manufactured by the American Fire Brick & Clay Co., of Mineral Point, O. The tile covers one square foot of surface and when the blocks are properly laid, the furnace bottom becomes very much like the shape of a sheet of corrugated iron. The corrugations are, however, made deep, so as to allow of the radiation of heat and expansion of gases underneath the packs of sheets which are placed on the top of the corrugation. In old methods a bottom made



of broken flue cinder is used, or, more commonly, coke is placed on the furnace bottom, to make the heat of packs more uniform. By use of this tile the expense of burning coke is avoided and cleaner, better results are obtained. The tiles are used for pair furnaces or heating furnaces. In furnaces for heating bars they are placed crosswise of the furnace, and for heating sheet packs they are placed lengthwise, making a clean bottom which retains a large amount of heat and secures the best results.

A. DeVathaire, the well-known French iron master, says regarding the desulphurization of liquid cast iron that it may be done by the use of the non-oxidized salts of barium, especially the ferro-cyanides, which are easily decomposed by heat into iron, carbon and barium. Barium ferro-cyanide is obtained by mixing the concentrated and boiling solutions of yellow prussiate and of barium chloride. A double barium and potassium ferro-cyanide, obtained by mixing equivalent weights of the two salts in solution, has generally given the best results. The reaction must be effected in the exclusion of air and of every oxidizing action. On melting in a lined crucible, with the cover luted, a mixture of the sulphurous cast metal and of barium prussiate, with the addition of fluor-spar, it is easily perceived that all the sulphur passes into the slag around the ingot.

The complete novel in the January issue of *Lippincott's* is "The Waifs of Fighting Rocks," by Captain Charles McIlvaine. The scene is laid in the mountains of West Virginia. "By Telephone," is a stirring newspaper story by Francis C. Regal. "A Question of Responsibility," by Imogen Clark, deals with delicacy *vs.* lifesaving in a lodging-house. The other stories belong to Christmas, and are offered at the right time instead of a month beforehand. F. M. B., in "With the Autocrat," recalls some notable private utterances of Dr. Holmes, particularly on religion, and M. Kaufmann, discusses "Socialist Novels."

Mr. C. B. Holland, who has made two visits to the United States in connection with the affairs of the Otis Steel Co., is again in this country, and he proposes, I believe, to shortly return to America to complete the work that he has been doing on behalf of that concern. The fruits of Mr. Holland's labors are to be seen in the improved value of the company's property.—[London Coal and Iron Trades Review.

CAST-IRON FLANGES.

The large mouth-pieces of rendering tanks and upright bleaches are usually made of cast iron, and are provided with flanges through which pass the bolts that hold the covering plate in position. It is to these flanges that we wish to call attention in the present article.

Consider, for example, the mouth-piece illustrated in Fig. 1. The internal diameter of the casting, in this case was 30 inches, and a steam pressure of 100 pounds to the square inch was carried, making the total load on the cover-plate some 71,000 pounds. This load was transmitted to the flange of the casting by bolts, two of which are shown in the illustration. There was a sufficient number of bolts to withstand the load safely, and the main body of the casting was also stout enough to be safe. We desire to call attention, however, to the fact that since the cover-bolts are not in line with the body of the cast-

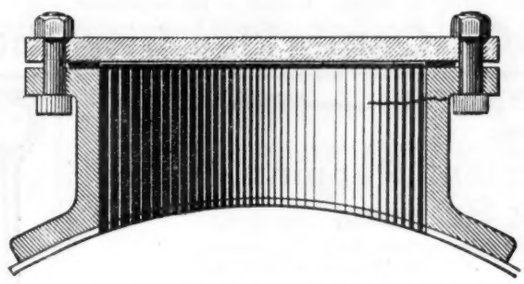


FIG. 1.—A CAST-IRON FLANGE WITHOUT BRACKETS.

ng, the strain in the flange is neither a simple shear nor a simple pull. In fact, the flange is in the condition of a beam loaded at one end and fixed at the other; and therefore the horizontal strain at the root of the flange will be a tension and its magnitude can be easily computed by means of the usual rules for beams. But the strain at the root of the flange is not due to the steam pressure alone, for in turning up the nuts on the bolts so as to secure a tight joint, we shall produce a very material addition to the strain on the flange, which we shall have to take into account.

By making certain reasonable assumptions concerning the strain on the bolts due to screwing up the nuts, we find that in the case under consideration the tensile strain on the main casting at the root of the flange was about 4,100 pounds. We cannot safely rate the tensile strength of cast iron higher than 15,000 pounds and hence the factor of safety in the present instance is only about 3⅔, whereas it ought to be about 10.

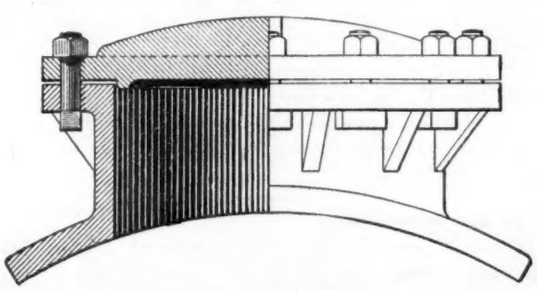


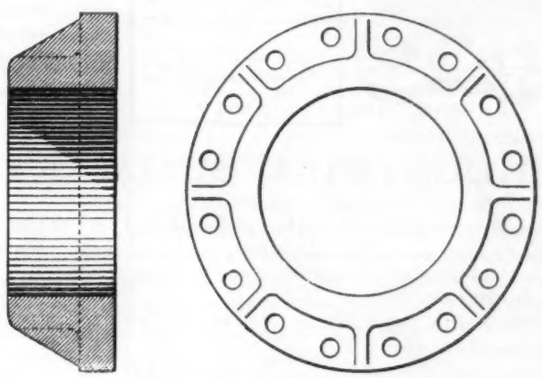
FIG 2.—A PROPER CONSTRUCTION FOR CAST-IRON MOUTH-PIECES

The packing being all within the line of bolts it is easy to see that if a slight leakage should occur, and the attendant should attempt to check it by screwing up the nuts unreasonably, the tensile strain on the casting would be still further increased, and the actual factor of safety correspondingly reduced. It will be evident from what has been said already, that the flanges of large cast-iron mouth-pieces should be carefully considered both by the designer and by the builder, even if the casting were equally sound throughout. It is well known, however, that castings are liable to be spongy at the root of the flange, where our analysis shows them to be weakest; and this fact should also be considered in designing and constructing them.

Lest any of our readers should fancy that we have exaggerated the dangers of cast iron flanges, let us say that we have known flanges three inches thick to break at the root from the causes we have described. We also have another case in mind in which an insipient crack occurred at the root of the flange of the mouth-piece of a digester carrying 100 pounds pressure, and although it was promptly discovered, it had extended along the mouth-piece for a distance of 20 inches (as indicated by the irregular line in Fig. 1), before the pressure in the digester could be reduced.

In order to provide against the breaking of cast-iron flanges care should be taken to make them abundantly thick; or, which we consider a better plan, they may be made with *brackets* running from the flange to the body of the casting at frequent intervals, as shown in Fig. 2. The cover may be flat, if it is made thick enough, but it is much better to provide ribs on the upper side of it, as in Fig. 2. Such ribs possess great stiffening power and add much more to the strength of the cover than the same amount of metal would if distributed in any other way. When the covers of digesters and bleachers have to be frequently removed, it is usual to slot the bolt-holes so that the bolts can be removed by merely loosening the nuts. They are also frequently so arranged that each bolt turns about a horizontal pin that passes through holes in a pair of parallel brackets cast on the body of the mouth-piece. The discussion of the features is reserved for a future issue, however, as we are here concerned merely with the strength of cast-iron flanges.

The reasoning that we have given in connection with mouth-piece flanges is also applicable to the cast-iron flanges used in connecting large steam pipes that are designed to



FIGS. 3 AND 4—DESIGN FOR A CAST-IRON FITTING FOR A 10-INCH STEAM PIPE

carry heavy pressures. Figs. 3 and 4 show a front view and a sectional view of a bracketed flange connection as designed for a ten-inch steam main, and a design substantially similar may be used for other sizes of pipe.—[The Locomotive.

Estimating Pig Iron Production for 1894

We estimate that the production of pig iron in the United States in 1894 will be about 6,600,000 gross tons. This estimate is based on the actual production of the first six months of 1894, and an estimate for the last six months of the year based on our monthly reports of furnaces in and out of blast. Actual figures, assuming that the make on Jan. 1, 1895, will be no less than it was Dec. 1, 1894, are as follows:

	Gross tons.
Actual make first six months, 1894	2,717,983
Estimated, last six months	3,858,166
	6,576,149

The make at the beginning of July, 1894, was but 86,529 tons, which rapidly increased, until Aug. 1 it was 114,506 tons, 149,398 tons Sept. 1, 158,567 tons Oct. 1, 171,414 Nov. 1, and 178,325 tons Dec. 1. The probabilities are that the make, owing to the fact that the production has been an increasing one is a little in access of what our reports show, so we estimate it at 6,600,000 tons; which will probably not vary greatly from the actual facts. The production for the first and second halves of 1893 was as follows:

Production first half of 1893, gross tons	4,562,918
" second " " " "	2,561,584
	7,124,502

It will be seen, therefore, that the production of 1894 is probably about 500,000 tons less than that of 1893 It will also be noted that the two half years' productions are reversed, the largest production of 1893 being in the first half year; of 1894 in the last half year.—[American Manufacturer.

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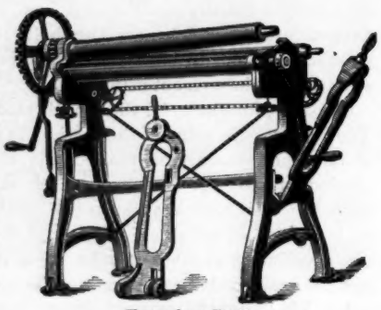

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INDUSTRIAL SUMMARY.

New Buyers in the Market, and Some of Their Wants:—

[If you are in need of machinery of any description, please notify *The Iron Trade Review* and we will put you in communication with our advertisers at once.]

The Moline Brass Works, Moline, Ill., will buy a gasoline engine of two to five h. p.

"C.," 6331 Sheridan ave., Chicago, will buy a 40 to 50 h. p. boiler and a 10 to 15 h. p. engine.

The Chattanooga Foundry & Pipe Works, whose plant is at Bridgeport, Ala., wants price on a lathe.

The Peterson Mfg. Co., Kent, O., wants to purchase a second-hand lathe, 8 or 10 feet between centers.

The Simonsen-Walter Mfg. Co., Jefferson City, Mo., want to buy a small second-hand plain milling machine.

Nathan B. Higbie, 89 Lake st., Chicago, will purchase a second-hand 90 to 110 h. p. Hamilton Corliss engine.

P. Becker Co., corner Monroe and Market sts., Chicago, wants to buy a second-hand engine of from 50 to 60 horse power.

A second hand screw machine, an automatic lathe and a No. 4 stamping press are wanted by "Wheeler," 13 S. Union st., Chicago.

The Meridian Machine shops, Meridian, Miss., will purchase an automatic engine, a boring and turning mill and a hydraulic wheel press.

The Eaton & Prince Co., 76 Michigan st., Chicago, is in the market for a modern automatic engine, 60 to 80 h. p., and two dynamos, 110 volts, 16 k. w. each; must be in the best condition.

John Richardson, proprietor of the Corning Foundry, Corning O., is in the market for a steam hammer with 6-inch cylinder and 600-pound blow. Give price, terms and other details.

The Mosher Mfg. Co., of Dallas, Tex., will purchase in the near future, a 15-ton cupola, a 10-foot boring mill, a lathe of about 42-inch swing and a combination punch and shear, either new or in good order, second-hand.

Additions, Enlargements, Removals, Etc.:—

The machine shop of Snyder & Fisher, at Little Falls, N. Y., is to be enlarged by the building of a two-story addition.

The Frankford Steam Forge Works will remove from Philadelphia to Ellwood City, Pa. Ground has been broken at the latter point and work will be pushed through the winter.

New Construction:—

P. M. Shapples' proposed new foundry at West Chester, Pa., is under construction. The walls have been laid for the foundation and they are about completed.

The Oakland Iron Works, of Oakland, Cal., recently damaged by fire, will erect a new shop 100x100 feet, all under one roof, but divided into three parts by columns extending to the roof.

The King Bridge Co., Cleveland, is erecting an iron building for the Longmead Iron Works, of Conshohocken, Pa. It will be finished early in January and the Longmead Iron Co. will start it at once as a skelp mill.

The Naugatuck Malleable Iron Co., at Naugatuck, Conn., have placed the contract for their new annealing room with the Berlin Iron Bridge Co., of East Berlin, Conn. The building will be 94 ft. wide and 175 ft. long, entirely of fireproof construction.

The growth of the business of the Elliott-Washington Cold-Rolled Steel Co., of New Castle, Pa., has led to the preparation of plans for a new plant. The building will be 150 feet long and an annealing furnace together with four sets of rolls and a powerful engine.

Fires and Accidents:—

Lincoln & Jewett's iron foundry, at South Boston, Mass., has been damaged by fire to the extent of $6,000; partly insured.

A ladle crane broke at the Carnegie steel works at Duquesne last week, which caused six furnaces to chill. The loss is estimated at from $10,000 to $12,000

The loss by the burning of the Novelty Iron Works at Ashland, Wis., Nov. 28, was $25,000, with only small insurance. There was a boiler shop; blacksmith shop and foundry and machine shop.

An explosion at the Red Jacket Furnace, at New Castle, Pa., on Dec. 8, threw ten tons of the burden into the air, but beyond the slight burning of one man there were no injuries. The damage has been repaired.

General Industrial Notes:—

The New Philadelphia (O.) nail works started up Monday, Dec 17.

The Benwood plant of the Wheeling Iron & Steel Co. has resumed in full.

The Carbon Steel Co., Pittsburg, has secured a small contract for ship plates for the Japanese navy.

MOUNT SAVAGE FIRE BRICK.

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The Youngstown Iron & Steel Roofing Co., whose plant is at Haselton, O., has received an order for over 90 tons of roofing.

The Bucyrus Steam Shovel & Dredge Co., of South Milwaukee, Wis., have increased their capital stock from $150,000 to $250,000.

The Quast Gas Engine & Mfg. Co., Bucyrus, O., has filed at Columbus an amendment changing name to the Quast Gas & Gasoline Engine Co.

The Reader Foundry Co. has been incorporated in Chicago, by John S. Brown, John King and Andrew Strong, with a capital stock of $50,000.

Since the fire at its plant, the Enterprise Foundry Co., of Allegheny, Pa., has confined itself to the manufacture of sash pulleys and shutter hinges.

The Morton Tin Plate Co., of Cambridge, O., has secured enough experienced tin mill workers at Pittsburg to run two of its three mills non-union.

The Berlin Iron Bridge Co., of East Berlin, Conn., are furnishing the iron work for the new office building of The Pope Mfg. Co., at Hartford, Conn.

The tin plate plant at Ellwood City, Pa., idle for 12 weeks, will start up non-union. The union employes have posted bills warning all tin platers to stay away.

Ford & Donnelly, Kokomo, Ind, have just completed shipment of four additional tinning pots and four tubular boilers to the Atlanta Steel & Tin Plate Co.

The tin plate works of Goldsmith & Lowenberg, at Kensington, is well under way. The iron buildings are partly up and foundations are being laid for the machinery.

The Great Western Tin Plate Co. has been chartered under the laws of Illinois; capitalized at $300,000. Charles H. Wilcox, John D. Lewis and Elisha C. Ware are the incorporators.

The Weimer Machine Co., of Lebanon, Pa., has booked orders for its liquid cinder cars from the Illinois Steel Co., the Poughkeepsie (N. Y.) Iron Co, and the Sloss Iron & Steel Co., of Birmingham, Ala.

The Southwark Foundry & Machine Co., of Philadelphia, is building a blowing engine with compound steam and compound air cylinders for pumping natural gas to Pittsburg from wells about 40 miles distant.

The Edgar Thomson Steel Works will be closed for but one week at the beginning of the year. Orders for steel have increased recently. The rail straighteners who struck two months ago have asked to be re-instated.

A plan is on foot to reorganize the Akron (O.) Iron Co., now in the hands of Receiver J. A. Long. Many creditors have consented to terminate the receivership and they will have control of the new company until they are paid.

The dinkey mill at the Arethusa Iron Works, New Castle, Pa., has been greatly improved and its capacity enlarged. Forty inch rolls have been substituted for the 36-inch rolls, and all the parts have been much strengthened.

A movement is on foot to transfer the works of the West Superior Iron & Steel Co., at West Superior, Wis., to the Great Northern Railway Co. for use as general shops for the manufacture of railroad material and repair work.

The plant of the Robison Co., of Bellwood, near Hollidaysburg, Pa., manufacturers of electric machinery, has been sold by the receiver to a company of Altoona capitalists. There will be a resumption of operations with work for 125 men.

The Pittsburg Tin Plate Works, New Kensington, Pa., have recently completed the erection of mills for rolling black plate, and the plant of this concern, which has been idle for some time, has been put in operation with non union men.

At the New Castle Wire Nail Works the management propose to have all die repairing and adjusting done by four men instead of each wire drawer attending to his own die and receiving pay for the work at the regular rate. The men object.

The furnace of the Warwick Iron Co., at Pottstown, went into blast Oct. 1, 1892, and has since run continuously, making about 110,000 tons of iron. In the week ending Dec. 1 the output was 1164 tons, which has only once been exceeded by the furnace.

Fifty workmen from Pittsburg and Leechburg applied for work at the tin plate plant of the U. S. Iron & Tin Plate Co., at Demmler, Pa., last Thursday. Only ten were employed, the company stating that it had as many men as it wished. Finished tin is to be turned out at the works this week.

At Muncie, Ind., the court has confirmed the receiver's sale of the plant of the White River Iron & Steel Co. for $16,000. T. F. Rose, the purchaser, represented certain creditors. The objections to the confirmation of the sale were made in behalf of a Cincinnati interest that desired to get control of the property.

Commenting on the starting of the Watts steel plant the Middlesborough, Ky., *News* says: "While the starting of this plant is to a certain extent an experiment, there is no experiment about the making of steel. The plant's continued operation depends solely upon the state of the steel trade and

upon the degree of success with which the Watts Syndicate meets the disposal of its output. Should a ready sale for the steel be found, the immediate operation of the six remaining furnaces will soon follow, and this will necessitate the starting of their two blast furnaces."

At the Salem (O.) Wire Nail Mill the management attempted a re-adjustment some time ago, but it was rejected by the men. Since that time the mill has bought its wire, considerably cheapening the cost of nails. Quite a number of the employes in the wire-drawing department have removed to New Philadelphia.

At Anniston, Ala., the reorganization of the Woodstock Iron Co. into the Woodstock Iron Works has been perfected, and Wm. G. Ledbetter was elected president; Hoffman Atkinson, secretary, and James W. McCulloh, treasurer. First mortgage bonds for $250,000 will be issued at once and complete repairs made to the blast furnace.

H. E. Collins & Co., Pittsburg, sole agents in the United States for the Cahall vertical water tube boiler, manufactured by the Aultman & Taylor Machinery Co., report the following sales: 250 horse-power for the Salem Iron Co., Leetonia, O.; 250 horse-power for the Sharon Iron Co., Ltd., Sharon, Pa. These boilers are to utilize blast furnace gases as fuel.

Arrangements are being made to enlarge and put in full operation the tin plate mill at Locust Point, Baltimore. More machinery has been purchased from the Totten & Hogg Steel & Iron Foundry Co., of Pittsburg. Between 250 and 300 men will be employed. Matthai, Ingram & Co., of Baltimore, who are interested in the works, will use much of the plate in making tin-ware at their shops near the mill.

The general tendency to reduce expenses in the handling of material is shown by the Lowell Bleachery & Dye Works, of Lowell, Mass., who are at present installing a very complete system of cars and track for handling their coal. In their boiler room they will have an especially fine equipment, as they are to lay cast plate track, which will present a very fine appearance. This railway is to be of the standard gauge, 21½ inches, and is to be furnished by the C. W. Hunt Co., of New York.

The Wage Account in '94 and '93.

Pa roll statements for November forwarded to R. G. Dun & Co., by manufacturers all over the country, show an increase of total payments of 15.2 per cent. over last year, but a decrease of 18.3 per cent. in comparison with 1892. A statement of hands employed shows that in the same establishments 10.2 per cent. more persons were employed than a year ago, but 8.6 per cent. less than in 1882. The average of earnings for over 250,000 hands is four per cent. larger than in 1893, but 14½ per cent. less than in 1892, and this statement takes no account of hours of work in the months compared, or of the establishments not working at all this year. In some of the industries more hands are at work than in 1892, but in others the decrease is large.

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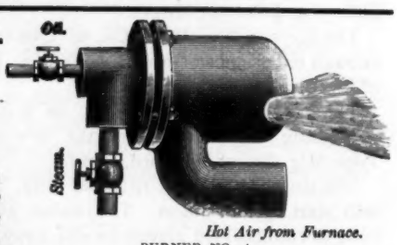

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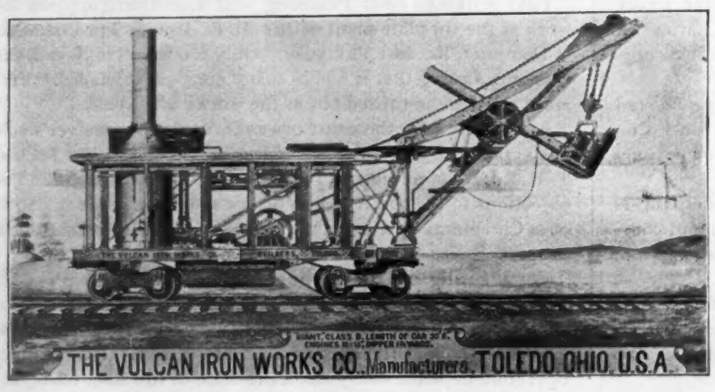

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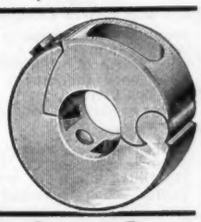

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STEAM SHOVELS
STEAM DREDGES
WRECKING CARS
PILE DRIVERS

In Five Sizes for Railroad and Contract Work, Brick Yards, Stone Quarries, Stripping and Handling Iron Ore, Coal, Etc.

Of All Types and Sizes; for All Purposes; Elevator, Dipper, Clam Shell, Suction. Special Machines for Special Work.

BOTH HAND AND STEAM. CAPACITIES 10 TO 35 TONS.

WITH EITHER DROP OR STEAM HAMMERS.

SOUTH MILWAUKEE, WIS., or BUCYRUS, OHIO.

SPECIALTIES:
Am. Crusher and Am. Ball Pulverizer.

THE AMERICAN MINING & MILLING MACHINERY CO.,
29 Euclid Ave., CLEVELAND, O. 280 Caxton Blk., CHICAGO, ILL.

The Simplest, Cheapest and Best Machines in the Market. Pulverize wet or dry to any degree of fineness. Make little or no slimes in wet nor dust in dry work. Four sizes, capacity from 2 to 60 tons per day.

SEND FOR CATALOGUE.
Cable Address, American.

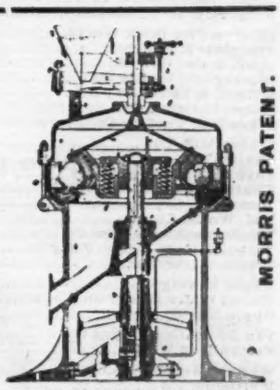
First Prize and Gold Medal Awarded by World's Fair, 1893.

Office of THE CLEVELAND IRON ORE PAINT CO. and THE GARRY IRON ROOFING CO.,
CLEVELAND, O., Jan. 25, 1894.

The American Mining & Milling Machinery Co., Cleveland, O.:

GENTLEMEN: We purchased a No. 2 American Rock Breaker and a No. 2 American Ball Pulverizer from your company about one year ago. The latter part of April, 1893, we started up for regular work, since which time we have run both of said machines to the full extent of our demands and to our entire satisfaction. The first 700 tons of hard iron ore that we pulverized for paint purposes was ground without taking the Pulverizer apart, and without expending one dollar for repairs for either of these machines. Of the 700 tons spoken of, about 200 tons was Lake Superior Specular iron ore, containing some 70 per cent. iron; a very difficult ore to pulverize. The remainder was a red fossiliferous iron ore, carrying quite a per cent. of silex, which cuts out buhr-stones rapidly. We find that the steel balls, which were when new 5 in. in diameter, now caliper 4⅝ in., and are perfectly round and smooth. The grinding track shows very little wear, and the driving track shows LESS; in fact, the wear is almost imperceptible. These two machines crush and pulverize more than one ton per hour with LESS than 12 H. P. We do not know of any Crusher or Pulverizer that can compare with the output of these two machines in quantity, quality, small amount of wear and tear, and like power. In our opinion, you cannot recommend them too highly. Very truly yours,

CLEVELAND IRON ORE PAINT CO.



THE AM. BALL PULVERIZER.

MORRIS PATENT.

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The star (*) indicates that the adv. appears alternate weeks; the dagger (†) once a month; the double dagger (‡) once in three weeks; the parallel (‖) three times out of four.

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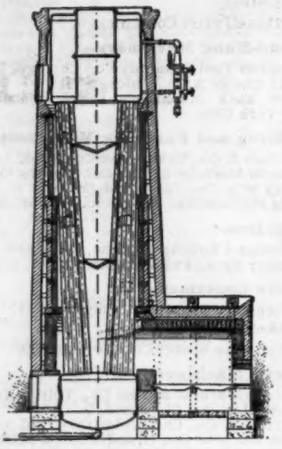


VERTICAL WATER TUBE BOILER

Best in the World.

MANUFACTURED BY

The AULTMAN & TAYLOR MACHINERY CO.

Mansfield, Ohio.

Highest Efficiency, Lowest Price.

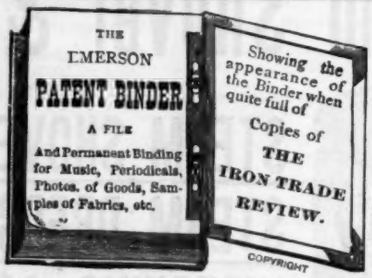
Leads all makes of boilers in economy, capacity, ease of examination, cleaning and repairs. Send for description, tests, references and estimate before you purchase.

H. E. COLLINS & CO.,

Sole Sales Agents for the United States.

Bank of Commerce Bldg., PITTSBURG, PA.

933 Rookery, CHICAGO, ILL.



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OR

1141 Monadnock Blk., Chicago, Ill.

Room 508, Cuyahoga Building, Cleveland, Ohio.

Jopling & Escobar,

ENGINEERS.

Mining Reports and Estimates. **Spanish-American Business a Specialty.**

IRON AND STEEL MARKETS.

IRON ORE.

[On Lake Erie docks.]

No. 1 Specular, Bessemer	3.00@ 3.35
No. 1 Bessemer hematite	2.75@ 3.00
Hematites No. 1 non-Bessemer	2.00@ 2.50
No 1. Specular, non-Bessemer	2.35@ 3.00

PIG IRON.

CLEVELAND (f. o. b. cars):	
Bessemer	$10 65@$00 00
No. 1 Strong Foundry	11 25@ 11 65
No. 2 Strong Foundry	10 25@ 10 65
No. 1 Gray Forge, red short	9 50@ 9 75
No. 2 Gray Forge, neutral	9 25@ 00 00
No. 1 American Scotch	11 65@ 00 00
No. 2 American Scotch	10 65@ 00 00
Lake Superior Charcoal	13 00@ 13 50
PITTSBURG:	
No. 1 Foundry	$11 25@$11 75
No. 2 Foundry	10 25@ 10 75
Gray Forge	9 50@ 9 75
White and Mottled	9 00@ 9 25
Warm Blast Charcoal	18 00@ 19 00
Cold Blast Charcoal	22 00@ 26 00
Bessemer	10 65@ 00 00
CHICAGO (reported by our representative:)	
Lake Superior Charcoal	$13 00@$14 50
Local Coke Foundry No. 1	10 25@ 10 50
Local Coke Foundry No. 2	9 75@ 10 00
Local Coke Foundry No. 3	9 40@ 9 65
Local Scotch Foundry No. 1	10 25@ 10 50
Local Scotch Foundry No. 2	9 75@ 10 00
Local Scotch Foundry No. 3	9 50@ 9 75
Southern Coke No. 1	11 00@ 11 25
Southern Coke No. 2	10 25@ 10 50
Southern Coke No. 3	9 75@ 10 25
Southern No. 1 Soft	10 25@ 10 50
Southern No. 2 Soft	10 00@ 10 25
Southern Silveries No. 1	11 50@ 11 75
Southern Silveries No. 2	11 25@ 11 50
Jackson Co. Silveries	15 00@ 16 00
Ohio Silveries No. 1	14 00@ 14 50
Ohio Silveries No. 2	13 00@ 13 50
Ohio Strong Softeners	13 00@ 13 50
Alabama Car Wheel	17 50@ 18 00
Malleable Bessemer	10 50@ 11 25
Coke Bessemer	11 25@ 11 50
CINCINNATI (reported by Rogers, Brown & Co.)	
Southern Coke No. 1, Foundry	$ 9 75@$10 00
Southern Coke No. 2 and No. 1 Soft	9 25@ 9 50
Hanging Rock Coke, No 1	12 00@ 12 50
Hanging Rock Charcoal No. 1, Fdy	16 00@ 17 00
Tennessee Charcoal No 1	14 00@ 14 50
Jackson County Stone Coal No 1	14 50@ 15 00
Southern Coke, Grey Forge	8 50@ 8 75
" " Mottled	8 25@ 8 75
Standard Alabama Car Wheel	15 75@ 16 50
Tennessee " "	15 50@ 16 75
Lake Superior " "	14 00@ 14 00
BUFFALO (reported by Rogers, Brown & Co.)	
No. 1 Foundry Strong Coke Iron Lake Superior Ore	$11 75
No. 2 Foundry Strong Coke Iron Lake Superior Ore	11 25
Ohio Softener No. 1	12 25
Jackson Co. Silvery No. 1	15 75@ 16 75
Lake Superior Charcoal	13 75
Southern Soft No. 1	11 25
Hanging Rock Charcoal	18 50
ST. LOUIS (reported by Rogers, Brown & Meacham):	
Southern Coke No 1	$10 75@$11 25
Southern Coke No. 2	10 00@ 10 25
Southern Coke No. 3	9 75@ 10 00
Southern Gray Forge	9 50@ 9 75
Southern Charcoal No. 1	14 00@ 14 50
Missouri Charcoal No. 1	12 50@ 13 00
Ohio Softeners	14 00@ 14 50
Lake Superior	15 50@ 16 00
Southern	16 75@ 17 00
Connellsville Coke, St. Louis	4 50

OLD RAILS AND SCRAP METAL.

[Prices paid by mills.]

	GROSS TONS
Old iron rails	$12 50
Old steel rails	10 00
	NET TONS
No. 1 R. R. wrought scrap	$ 9 50
No. 1 wrought scrap	8 50
No. 1 Machine cast scrap	8 50
Iron axles	15 50
Axle turnings	8 00
Wrought turnings (free from cast)	6 50
Cast borings	5 50
Uncut wrought iron boilers	4 00
Steel boiler plates	8 00
Grate bars	5 50
Pipes and flues (clean)	7 00
Tank iron	6 75
Hoop and band iron	6 00
Sheet iron	5 00
Wrought drillings	6 50
Malleable iron	7 00

STRUCTURAL MATERIAL.

Beams and Channels (f. o. b. mill)	1.25c@1.35c
Angles	1.20c@1.25c
Tees	1.35c@1.45c
Universal Plates	1.20c
Sheared Plates	1.30c

MERCHANT IRON AND STEEL.

[List prices out of store.]

Flat Bar.

1½ to 4 by ⅜ to 1 inch	1 30
4¼ to 6 by ⅜ to 1 inch	1 35
1½ to 6 by 1⅛ to 2 inch	1 50
1¼ & 1⅜ by ⅜ to ¾ inch	1 35
1 & 1¼ by ⅜ to ¾ inch	1 40
⅛, ¼, ⅜, by ⅜ to ⅝ inch	1 50

Frank P. Cady, Pres. and Supt.
Geo. H. Bowler, Sec'y and Treas.

THE CADY MFG. CO.

283 W. River St., CLEVELAND, O.

AUTOMATIC MACHINERY.
Power Presses, Dies, Drop Hammers, Punches and Shears, Wire Straightening and Cutters, Wire Forming Machines
SEND FOR CATALOGUE.

PERFORATED METALS
OF ALL KINDS FOR
MILLING MINING AND AGRICULTURAL MACHINERY,
PERFORATED IRON, STEEL, COPPER, BRASS, TIN, ZINC, LEAD, ETC., TO ORDER.
LARGE AND VARIED ASSORTMENT OF SIZES. CORRESPONDENCE SOLICITED.
THE ROBERT AITCHISON. PERFORATED METAL CO.,
OFFICE, ROOM 510 265 TO 269 DEARBORN STREET, CHICAGO, ILL. WORKS SOUTH CHICAGO.

Splice Bar Punch.

—THE—
Long & Allstatter Co.
HAMILTON, O., U. S. A.

Manufacturers of Belt, Steam and Electrically driven

POWER PUNCHES and SHEARS,

for all kinds of Boiler, Tank and Structural Iron Work, Rolling Mills, Locomotive Shops, Car and Wagon Shops, Plow Shops, etc. Send for Catalogue.

A. H. LEITCH, PRES JOHN C. LEITCH, SEC. AND GENL. MAN. JOHN A. WILSON, TREAS.

WESTMORELAND FIRE BRICK CO. MANUFACTURERS OF HIGH GRADE **FIRE BRICKS.**
PITTSBURG, PA.
Works and Mines, Westmoreland, Pa.

DIXON'S GRAPHITE PAINT

FOR TIN OR SHINGLE ROOFS AND IRON WORK. IT IS ABSOLUTELY WITHOUT AN EQUAL.

Tin roofs well painted have not required repainting for 10 to 15 years.

If you need any paint it will pay you to send for circular.

JOSEPH DIXON CRUCIBLE CO., Jersey City, N. J.

IRON CLAD PAINT CO.
Factory, 75 & 77 Central Way. Sec. & Treas., No. 3 Case Build'g,
CLEVELAND, OHIO.

Trade Mark Patented.

ORDER DIRECT FROM THE
Iron Clad Paint Co.

And get the genuine article, and save liability of suit for using an article made in violation of the patents issued to Wm. Green, and now owned by this Company.

IRON CLAD PAINT is the most durable, most fire-proof and Cheapest Paint made.

FURNISHED both Dry and Ground in Oil

USED BY NEARLY ALL THE RAILROADS.

Round and Square.

1 to 1⅞ inch	1 30
2 to 2⅞ inch	1 40
2¾ to 3¾ inch	1 55
3⅞ to 4 inch	1 80
4⅛ to 4⅞ inch	2 40
4¾ to 5 inch	2 60

Oval.

⅜ to 1¼ inch	1 50
⅝ to ¾ inch	1 50
½	1 70
⅜	1 90

Half Oval and Half Round.

1⅛ to 3 inch	1 85
⅜ to 1⅛ inch	1 65
⅝ to ¾ inch	1 90
½	2 05
⅜	3 15

Heavy Band.

1¼ to 6 by ¼ and 5-16 inch	1 40
1 to 1¾ by ¼ and 5-16 inch	1 45
⅜ to ⅞ by ¼ and 5-16 inch	1 55
½ to ⅝ by ¼ and 5-16 inch	1 80

Hoop Iron.

1 7-16 to 4, No. 13, 14, 15 and 16	1 85
1 7-16 to 2, No. 17, 18 and 19	1 90
1 7-16 to 2, No. 20	2 00
1 7-16 to 2, No. 21	2 10
1 7-16 to 2, No. 22	2 20
1⅛ to 1⅜, No. 13, 14 and 15	1 90
1⅛ to 1⅜, No. 16, 17 and 18	1 95
1⅛ to 1⅜, No 19 and 20	2 00
1⅛ to 1⅜, No. 21	2 10
1⅛ to 1⅜, No. 22	2 20
15-16 and 1 inch, No. 13, 14 and 15	1 85
15-16 and 1 inch, No. 16, 17 and 18	2 00
15-16 and 1 inch, No. 19 and 20	2 10
15-16 and 1 inch, No. 21	2 20
15-16 and 1 inch, No. 22	2 30
⅞, No. 13, 14 and 15	2 10
⅞, No. 16, 17 and 18	2 20
⅞, No. 19 and 20	2 30
⅞, No. 21	2 40
⅞, No. 22	2 50
13-16, No. 13, 14 and 15	2 20
13-16, No. 16, 17 and 18	2 30
13-16, No. 19 and 20	2 40
13-16, No. 21	2 50
13-16, No. 22	2 60
¾, No. 13, 14 and 15	2 30
¾, No. 16, 17 and 18	2 45
¾, No. 19 and 20	2 55
¾, No. 21	2 65
¾, No. 22	2 75
11-16, No. 13, 14 and 15	2 55
11-16, No. 16, 17 and 18	2 60
11-16, No. 19 and 20	2 70
11-16, No. 21	2 80
11-16, No. 22	2 90
11-16, No. 23	3 00
⅞, No. 13, 14 and 15	2 60
⅞, No. 16, 17 and 18	2 70
⅞, No. 19 and 20	2 80
⅞, No. 21	2 90
⅞, No. 22	3 00
⅞, No. 23	3 10
9-16, No. 13, 14 and 15	2 80
9-16, No. 16, 17 and 18	2 90
9-16, No. and 20	3 00
9-16, No. 21	3 10
9-16, No. 22	3 20
9-16, No. 23	3 30
7-16 and ½ inch, No. 13, 14 and 15	3 00
7-16 and ½ inch, No. 16, 17 and 18	3 10
7-16 and ½ inch, No. 19 and 20	3 20
7-16 and ½ inch, No. 21	3 30
7-16 and ½ inch, No. 22	3 40
7-16 and ½ inch, No. 23	3 50
⅝, No. 13, 14 and 15	3 50
⅝, No. 16, 17 and 18	3 60
⅝, No. 19 and 20	3 70
⅝, No. 21	4 00
⅝, No. 22	4 10
⅝, No. 23	4 25

Light Band.

1¼ to 6 by ⅛ to 3-16 inch	1 60
1⅛ to 6 by Nos. 11 and 12	1 65
1 to 1⅜ by ⅛ to 3-16 inch	1 65
1 to 1⅜ by Nos. 11 and 12	1 70
⅞ and 13-16 by ⅛ to 3-16 inch	1 80
⅞ and 13-16 by Nos. 11 and 12	1 85
¾ and 11-16 by ⅛ to 3-16 inch	1 90
¾ and 11-16 by Nos. 11 and 12	1 95
⅝ and 9-16 by ⅛ to 3-16 inch	2 05
⅝ and 9-16 by Nos. 11 and 12	2 10
½ by ⅜ to 3-16 inch	2 20
½ by Nos. 11 and 12	2 25

Wagon Box Iron.

⅞ inch, beveled edge, by Nos. 11 and 12	1 80
⅞ inch, " " " " 13 and 14	1 90
¾ inch, " " " " 11 and 12	1 95
¾ inch, " " " " 13 and 14	2 15

Sheet Iron.

No. 10	1 85
No. 12	1 90
No. 14	1 95
No. 15-17	2 05
No. 18	2 20
No. 20	2 30
No. 22-24	2 40
No. 25-26	2 50
No. 27	2 60

Steel Boiler Plates—1-4 in. and Heavier.

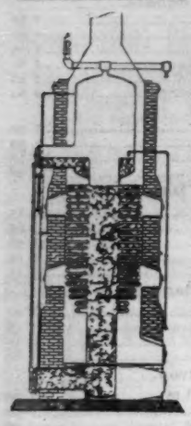
Tank	1 60
Shell	1 85
Flange	2 10
Marine Flange	2 35
Fire Box	3 35

Above includes plates 90 inches wide.

90 to 96 in. wide	½c. lb. extra
96 to 100 in. wide	1 c. "
100 to 104 in. wide	1½c. "
104 to 106 in. wide	special

American Cast Tool Steel.

ROUND, SQUARE AND OCTAGON.	cts. lbs
1 to 2 in. inclusive	08
9-16 to ⅞ in. "	08½



THE ADAMS
WATER TUBE BOILER.

This Boiler is absolutely safe from explosion. Gives as much steam from the waste heat as any boiler made. Easy of access for cleaning and repairs. Furnishes perfectly dry steam. Occupies little ground space. Economical in first cost. Send for complete circulars giving list of users and testimonials, one of which is printed below.

The Falcon Tin Plate & Sheet Co., }
Niles, O., Aug. 18, 1893. }

Chas. P. Adams, Esq.

Dear Sir: The three boilers of 225 H. P. each which you furnished us are working in every way satisfactory. We consider them as good steamers as any we have ever used. Up to the present time have spent nothing on them for repairs. Very respectfully,

The Falcon Tin Plate & Sheet Co.,
By Warner Arms, Pres't.

C. P. ADAMS.
807 The Cuyahoga, - CLEVELAND. O.

C. W. HUNT COMPANY,
45 Broadway, New York,

THE HUNT TIP CAR.

MANUFACTURERS OF

HOISTING AND CONVEYING MACHINERY

For moving all kinds of material in Steam Power Stations, Factories, Gas Works. Mines, Coal Yards, etc.

Tip Cars, Wire Rope, Barrows.
INDUSTRIAL RAILWAYS.

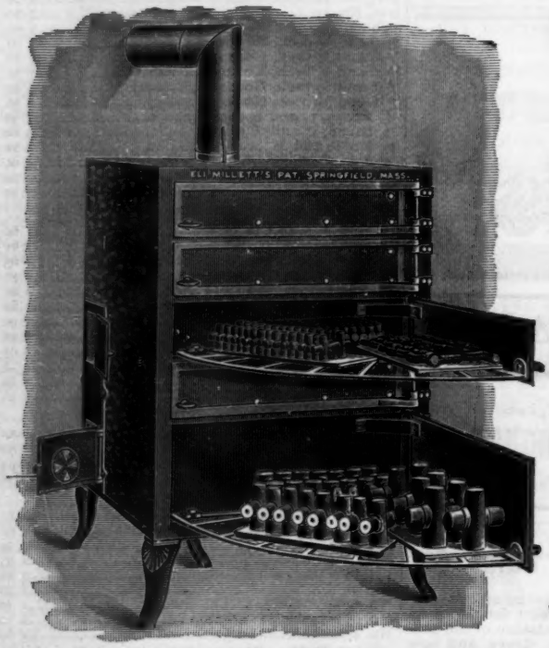
CLEVELAND ROLLING MILL CO.,
CLEVELAND, - OHIO,

—MANUFACTURERS OF—

BESSEMER AND OPEN-HEARTH STEEL,

Blooms, Billets, and Slabs, Steel Rails, Steel Beams, Channels and Angles. Steel Forgings, Bar Spring, and Sleigh Shoe Steel. Steel Wire of all kinds. Barbed Wire, Iron and Steel Plates, Galvanized and Black Sheet Iron and Steel Corrugated Iron Roofing.

MILLETT'S PATENT PORTABLE CORE OVEN.



THE BEST CORE OVEN
On the Market.

Saves Fuel,
" Expense,
" Time.

Does More Work and Makes Better Cores.

If you make small cores you need it.

Write us for Circulars and Prices.

MILLETT CORE OVEN CO.,
Brightwood, (Springfield) Mass.

Bolt and Nut Works.

THE UPSON NUT CO., Manufacturers of Nuts, Washers, Carriage, Machine, Plow and Elevator Bolts, Coach Screws, etc.

Steel Stamps and Stencils.

ELEHARTY, J. H. & Co., Rubber Stampes Seals, Stencils, Automatic Check Punchs, and Numbering Machines. 92 Seneca St.

7-16 to ⅜ and 2⅜ to 3 in. .09
3⅛ to 4 in. .09½
⅜ to 11-16 and 4⅜ .10
⅝ to 6 in. .10½
¾ to 9-32 and 6⅝ to 7 in. .11
3-16 in .13

Flats.

	cts. lbs.
2 to 9-16 in. wide by 2 to ⅝ thick	8

Bessemer and O. H. Steel.

Machinery	base price,	1 80
Tire	"	1 85
Spring	"	2 20
Sleigh Shoe	"	2 20
Toe Calk	"	2 05
Cutter Shoes, tapered and bent	"	2 45

English Tool Steel.

Jessop's .15½c
Hobson's "Best" .15½c
" "Choice" .35c

Burden Boiler Rivets.

⅛, ⅜, 11-16 and ¾ inches diameter .3 70
Bridge ½, ⅝, 11-16 and ¾ inch diam .3 40

MACHINERY SUPPLY MARKET.

Anvils.

American .₩ lb 9@10
Wright's .₩ lb 12

Bellows.

Blacksmiths' { Hill's .dis 40
Bullock's .dis 50&10
Moulders' .dis 40@40&10
Hand .dis 40&10@50

Belting.

Boston Belting Co.'s standard .dis 70
" " " extra .dis 60&5
" " " best .dis 55
Cleveland Rubber Co. extra standard .dis 60&10
Hoyt's Short Lap .dis 45
Shultz Raw Hide Leather Belting, single .dis 40
Munson's Short Lap Single Leather .dis 50
Munson's Short Lap Double and Light Double Leather .dis 50&10
Shultz Raw Hide Leather Belting, Double and Light Double .dis 40
Standard, oak tanned .dis 50&10
Alexander Brothers' pure oak tanned .dis 45

Blowers and Exhausters.

B. F. Sturtevant's .dis 20
Boston Blower Co. .dis 35
Buffalo .dis 40

Chucks.

Cushman's 4 Jaw Independent .dis 45
" Combination .dis 40
" Geared Scroll .dis 30
" 2 Jaw Brass Workers .dis 30
" Drill .dis 35
Wescott's Scroll Combination .dis 33⅓
" Independent .dis 40
" Little Giant Drill .dis 35
Horton's Universal .dis 40
" Independent .dis 45
Whiton's Independent .dis 45
National Combination .dis 40
Sweetland " .dis 40
Almond Drill .dis 20
Morse " .dis 15
Skinner's Combination Lathe .dis 40&10
" Independent Lathe .dis 40&10
" Universal Lathe .dis 40&10
" Drill .dis 20

Cutters and Reamers.

Cleveland .dis 10@15
Pratt & Whitney .dis 10@15
Standard .dis 10@15
Morse .dis 15
Brown & Sharpe, Milling Cutters .dis 15
" " Gear Cutters .dis 15

Crowbars.

Cast Steel .₩ 3½
Iron, steel points .₩ lb 3

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Twist Drills .dis 50&10
Morse Taper and Straight Shank to 1½" .dis 50&10
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Drill Sockets .dis 25
Standard Twist Drills .dis 55@55&5
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	No. 4 to 46 gr.	No. 54 to 150 gr.	Flour, C. F. F. F.
Kegs, ₩ lb	4½c	5 c	2½c
½ kegs ₩ lb	4¾c	5¼c	2¾c
¼ kegs ₩ lb	5 c	5½c	3 c
10 lb cans, 10 in case	6 c	6½c	5 c
10 lb cans less than 10	10 c	10 c	7½c

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Barder, Adamson & Co. .dis 50@50&5
H. H. Barton .dis 50@50&5

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Grant .dis 60@70
Sterling .dis 60@70
Celluloid .dis 10&33⅓
Northampton .dis 55
Crystal .dis 65@70
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Vulcanite .dis 60&10
Hamden .dis 60&10@70
Cyclone .dis 60@60&10

Files.

Arcade .dis 60&10@60&10&10
Nicholson .dis 60&10@60&10&10
" X. F .dis 25
Kearney & Foot .dis 60&10@60&10&10
Black Diamond .dis 60&10@60&10&10
McClellan .dis 60&10@60&10&10
Disston's .dis 65@70

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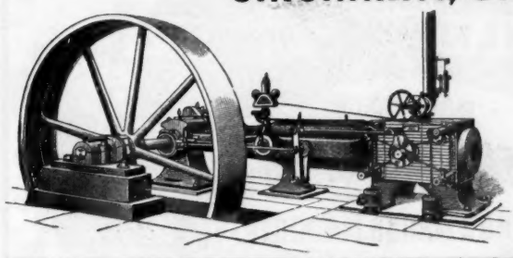

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Salem and Pittsburg	* 8:00 am	* 8:30 pm
Pittsburgh, Bellaire and East	†12:45 pm	† 6:25 pm
Philadelphia and New York	* 1:40 pm	*11:25 am
Baltimore and Washington	* 1:40 pm	*11:25 am
Alliance and Pittsburgh	* 1:40 pm	*11:25 am
Ravenna and Alliance	† 3:25 pm	† 9:50 am
Hudson and Ravenna	* 5:00 pm	* 8:25 am
Philadelphia and New York	*11:10 pm	* 5:25 am
Baltimore and Washington	*11:10 pm	* 5:25 am
Alliance and Pittsburgh	*11:10 pm	* 5:25 am

Mt. Vernon and Pan-Handle Route

FROM CLEVELAND TO	LEAVE	ARRIVE
Xenia and Cincinnati	* 8:40 am	* 5:15 pm
Akron and Columbus	* 8:40 am	*5:15 pm
Akron, Columbus & Zanesville	†2:45 pm	*12:10 pm
Akron and Orrville	† 3:25 pm	† 9.50 am
Columbus and Cincinnati	* 8:00 pm	* 6:55 am

Saturdays the 8:00 pm train will leave at 11:20 pm.

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	Arrive.	Depart
Akron & Canton	*6:30 P M	*7:10 A M
Akron, Canton & Valley Jctn.	*10:10 A M	*3:15 P M
Valley Jctn. & Way Stations	†6:30 P M	†7:10 A M
Akron, Canton & Chicago	*8:00 A M	*6:30 P M
Wooster and Chicago	†2:45 P M	†11:00 A M
Wooster		*6:30 P M
Akron, Canton & Marietta	†2:45 P M	†11:00 A M
Steubenville, Wheeling, Washington, D. C., and Baltimore	†2:45 P M	†11:00 A M

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Stub's	dis 25
Grobet's	dis 30
Reynolds Bros.' Hand Cut	dis 50
Industry File Works Hand Cut	dis 50

Hammers.

P. S. W	dis 40
Atha new list, Jan. 15, 1887	dis 50
Heavy hammers and sledges under 5 lbs	12c
" " " over 5 lbs	10c

Jack Screws.

Illinois Bolt Co. list	dis 75

Nuts and Washers.

Size of bolt inches	¼	5-16	⅜	½	⅝	¾	1
Square	8	7	5½	4¼	4	3¾	3¼
Hexagon	15½	11½	8½	6	5¾	5¼	
Washers	9	8	7	5	4½	4½	4½

In lots less than 100 lbs, ₩ lb add ½c., 1 lb boxes add 1c to list.

Nails (wire).

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Standard Penny Nails, ₩ keg card rate	
Car lots	$1.10
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Zinc and Tin	dis 60
Brass and Copper	dis 50
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American Packing Hemp	₩ lb 9@10
Russia " "	₩ lb 14
Italian " "	₩ lb 13@19
Plumbago Piston	₩ lb 40
Peerless	₩ lb 60
Morrison's "	₩ lb 45
Square Flax "	₩ lb 50
Sheet Rubber	₩ lb 12&24
Excelsior Rubber	₩ lb 48
Rainbow { Full Rolls	45c ₩ lb
Rainbow { Less than Full Rolls	50c ₩ lb
Eclipse Gasket	₩ lb 75

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Railroads, 5 to 6 lbs	$12 dis 60
" 6 to 7 lbs	$13 dis 60

Pulleys.

Iron Pulleys, Walker List	dis 50
Medart Pulleys	dis 50
Split Wood Pulleys	dis 55@60

Rivets.

Iron, Thousand, list November 17, 1887	dis 50&10@60
Iron, Ordinary, Cooper's Block and Carriage list November 17, 1887	dis 50&10@60
Copper	dis 50@50&10

Saws.

Disston's Circular	dis 40&10
" Band	dis 25
" Scroll	Net
Hack Saw Stubs	dis 20
" " Eureka	dis 20
" " Star	dis 20
Saw Swages Diston's	dis 30
Atkins' Circular Saws	dis 40&45
" Mill, Mulay and Drag Saws	dis 40&10
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Derfection "	$15 "
Petroit Saw Works, Circular	dis 50
" " " Band	dis 25
" " " Mulay	dis 45

Taps.

Cards, Hand and Nut to 2 in	dis 50
Carpenters' " " "	dis 50
Morse " " "	dis 50
Pratt & Whitney " " new list	dis 10
Machine Screw Taps	dis 55
Pipe Taps to 2½ in	dis 70
Stay Bolt Taps	dis 25
Stove Bolt Taps	dis 55
Pulley Taps	dis 40

Vises.

Solid Box	dis 60
Parker's	dis 20@25
Prentiss	dis 20
Stephen's	dis 25@30
Barrett's	dis 30
Miller's Falls	dis 40
Merrill's	dis 15@20
Howard	dis 35

Wire.

New List, Apr. 9, 1894

Brass	dis 40
Copper	dis 40
Bright and annealed, Nos. 0@18	dis 70&10@75
" " Nos. 19@26	dis 75@75& 5
" " Nos. 27@36	dis 75&10& 5
Coppered Nos. 0 to 18, market list	dis 70@70& 5
Galvanized Nos. 0 to 18 " "	dis65& 5
Tinned market Nos. 0 to 18	dis 67½
Cast steel	dis 50
Tinned Broom Wire	dis 70&5@70&10
Annealed Fence, Nos. 8 and 9	dis 75
Annealed Grape, Nos. 10 to 14	dis 75
Stub's Steel Wire regular	95c ₩ lb dis 30

Wrenches.

Coe's genuine	dis 50
Girard Standard	dis 70&10
Agricultural	dis 75&10
Mechanic's	dis 55&10& 5
Bemis & Call's Combination	dis 35
Donohue's Engineers	dis 20&10
Lamson & Sessions Engineers	dis 60
Billings & Spencer's Drop Forged	dis 25
William's " "	dis 25
Alligator " "	dis 40

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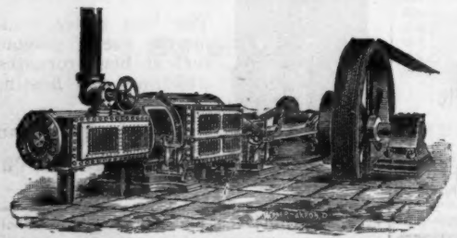

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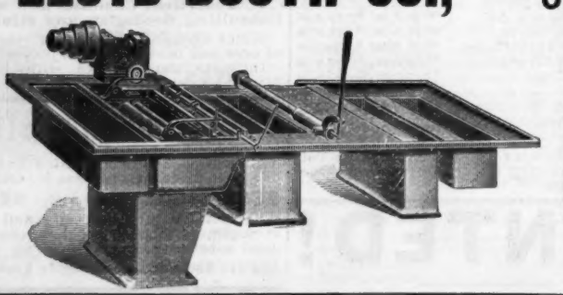

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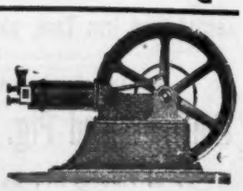

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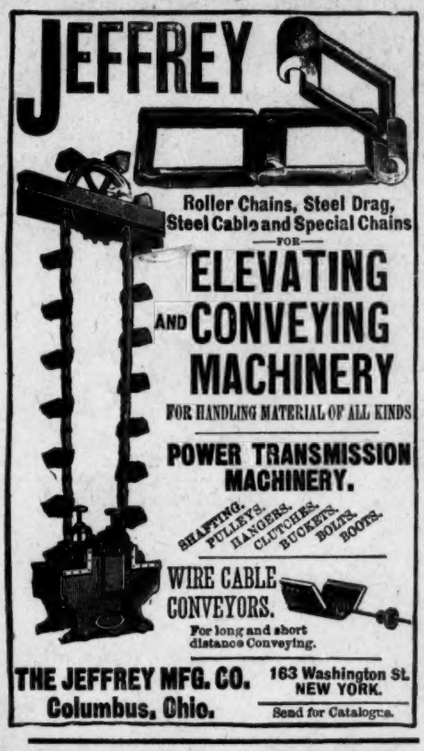

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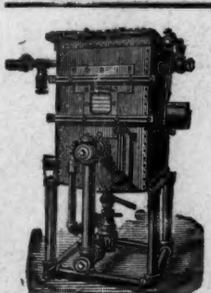

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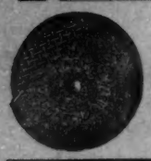

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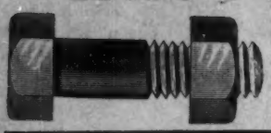

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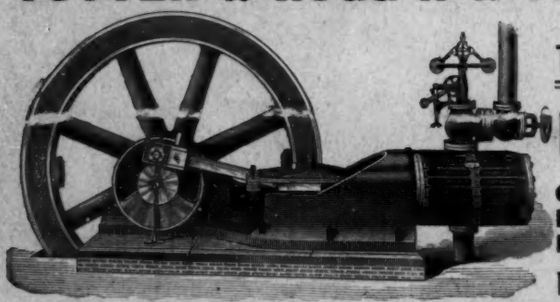

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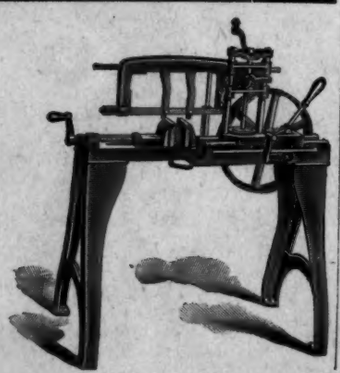

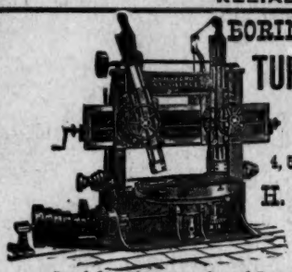

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